



Transport for NSW

Sydney Harbour Bridge Conservation Management Plan

Volume 1



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1. Introduction

1.1 Background

This Conservation Management Plan (CMP) has been prepared to provide a framework for the ongoing care and management of the Sydney Harbour Bridge (SHB), including decisions about its conservation, use and development, and to provide a reference for future applications for works.

The SHB is owned and managed by Transport for NSW on behalf of the New South Wales (NSW) State Government. The SHB is listed on the State Heritage Register (SHR) and the National Heritage List (NHL). It is therefore subject to the provisions of the *Heritage Act 1977* (NSW) and the provisions of the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act).

Updated conservation policies that reflect the changing uses of the SHB are provided to facilitate the conservation of its cultural heritage values consistent with its maintenance and repair as a publicly owned asset, and its ongoing use as the main vehicular, rail and pedestrian crossing for Sydney Harbour. Additional conservation policies are provided to facilitate the increasing use of the SHB as a platform for public events such as the 'Sydney New Year's Eve Welcome to Country, 9pm Family and Midnight Fireworks Displays' and 'Bridge Effects'.

The CMP consists of two volumes. These are: Volume 1- The main CMP document and Volume 2- the CMP Inventory Records. The first part of Volume 1 (Sections 1.0-4.0) includes a history of the SHB, an analysis of its current physical layout, context and fabric, and an assessment of its heritage significance, including comparison with comparable bridges.

The second part of Volume 1 (Sections 5.0–8.0) examines the curtilage, constraints and opportunities applicable to the SHB,

formulates conservation policies to guide its conservation, use and management, and sets out strategies for the implementation of these policies.

This CMP also includes analysis and policies developed as part of associated studies, including:

- Sydney Harbour Bridge—Assessment of National Heritage Values, Clive Lucas, Stapleton and Partners Pty Ltd, prepared for NSW Roads and Traffic Authority, February 2006
- Sydney Harbour Bridge Interpretation Plan, Godden Mackay Logan Pty Ltd, prepared for NSW Roads and Traffic Authority, 2007
- Sydney Harbour Bridge Movable Heritage Conservation Strategy, International Conservation Services, prepared for NSW Roads and Traffic Authority, 2007
- Sydney Harbour Bridge celebrating 75 years / RTA oral history program, Roads and Traffic Authority, 2007
- Sydney New Year's Eve Agreement 2016-2020, prepared by Roads and Maritime Services (now Transport for NSW), 2016.

Volume 2 of the CMP presents the SHB as a series of different precincts and provides details about the bridge in accordance with those precincts.

This CMP should be followed for any works affecting the SHB. Figure 1.1 shows the steps that should be followed prior to works being carried out on the SHB.

1.2 Study area

The SHB is part of the Bradfield Highway and links the southern and northern shores of Sydney Harbour, spanning from Dawes Point in the south to Milsons Point in the north (Figure 1.2). The study area is the boundary of the SHR heritage curtilage (Figure 1.3), which is identical to that of the NHL curtilage (Figure 1.4), except that the SHR curtilage also includes the northern approaches between Lavender Street and Arthur Street, Lavender Bay. Both curtilages include land that is in the ownership of the NSW Government, Property NSW (PNSW), the City of Sydney, North Sydney Council and RailCorp. Despite the defined heritage curtilage of the bridge precinct, this CMP also considers relevant values beyond these boundaries such as important views to and from the bridge.

The SHB is also located within the World Heritage List curtilage of the Sydney Opera House (SOH) buffer zone. The SOH buffer zone centres on the nearby waters of Sydney Harbour (Figure 1.5). It includes places around Sydney Harbour within a radius of 2.5 kilometres that have been identified as offering critical views to and from the SOH that contribute to its World Heritage significance. The buffer zone includes the SHB in its entirety and most of its approach spans.

While the study area includes Dawes Point (Tar-Ra) Park beneath the southern bridge approach and Bradfield Park beneath the northern approach, the parks are managed by PNSW and North Sydney Council respectively. The CMP primarily addresses how Transport for NSW should manage any potential impacts on these parks, rather than providing a framework for their management as public open spaces.

The SHB incorporates not only the arch, pylons and pylon towers, and approach spans but also two railway lines, a cycleway, footpaths and roads between the northern and southern approaches. This assessment encompasses the setting and the views to and from the SHB within Sydney Harbour, the fabric of the SHB and other associated elements including the surrounding parklands, subsurface remains and the movable heritage associated with the SHB, its construction and its continuing operation unless otherwise indicated, the use of the term 'SHB' or 'the bridge' includes the arch, deck, pylons and pylon towers, approach spans, approaches and surrounding parklands contained within the curtilage.

1.3 Existing heritage listings

1.3.1 Statutory listings

Links to the heritage listings discussed below are included in Appendix A.

a) National Heritage List (NHL)

The SHB was placed on the NHL on 19 March 2007 (Place ID 105888), on the 75th anniversary of the opening of the SHB. The main statute that governs the management of places listed on the NHL is the *Environmental Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act).

b) State Heritage Register (SHR)

The 'Sydney Harbour Bridge, approaches and viaducts (road and rail)' was placed on the SHR in June 1999 (SHR No. 00781).

The 'Milsons Point Railway Station Group' (which includes the area bounded by the SHB approach structure and reserves surrounding it), and 'The Argyle Street Railway Substation', were individually listed on the SHR in April 1999, while the 'Argyle Cut' and 'Dawes Point Battery Remains' were listed in May 2002. The main statute that governs the management of places listed on the SHR is the *Heritage Act 1977* (NSW) (Heritage Act).

c) Transport for NSW Section 170 Heritage and Conservation Register

In accordance with Section 170 of the Heritage Act, the Roads and Traffic Authority (now Transport for NSW) established a register to record all heritage items in its ownership or under its control.¹ The following items associated with the SHB, or in its heritage curtilage, are listed on the Transport for NSW Section 170 Heritage and Conservation Register:

1. The Transport for NSW S170 Register includes heritage assets formerly owned and/or managed by Roads and Maritime Services.

- Sydney Harbour Bridge, approaches and viaducts (Item No. 4301067)
- Transport for NSW Movable Heritage Collection (Item No. 4311604).

d) RailCorp Section 170 Heritage and Conservation Register

In accordance with Section 170 of the Heritage Act, RailCorp maintains a register of all heritage items in its ownership or under its control.² The following items associated with the SHB, or in its heritage curtilage, are listed on the RailCorp Section 170 Heritage and Conservation Register:

- Milsons Point (Fitzroy Street) Underbridge (SHI No. 480822)
- Milsons Point (Lavender Street) Underbridge (SHI No. 4801823)
- Milsons Point Railway Station Group (SHI No. 481026, SHR No. 01194)
- North Sydney (Arthur Street) Underbridge (SHI No. 4801024)
- Sydney Harbour Bridge (Rail Property Only) (SHI No. 4801059)
- The Rocks (Argyle Street) Railway Substation and Switchhouse (SHI No. 4800006)
- The Rocks (Argyle Street) Underbridge (SHI No. 4801821)
- Wynyard Former Tram Tunnels (SHI No. 4800281).

e) Property NSW Section 170 Heritage and Conservation Register

In accordance with Section 170 of the Heritage Act, PNSW maintains a register of all heritage items in its ownership or under its control. The following items associated with the SHB, or in its heritage curtilage, are listed on the PNSW Section 170 Heritage and Conservation Register:

- Cannon, Dawes Point Park, The Rocks (SHI# 4500491).
- Dawes Point Battery Remains, Hickson Road, The Rocks (SHI No. 5053114, SHR No. 01543)
- Dawes Point Heritage Precinct, George St, Lower Fort St, Hickson Rd & Harbour Promenade, The Rocks (SHI No. 4500497)
- The Rocks Conservation Area, The Rocks (SHI No. 4500458)

f) Sydney Local Environmental Plan 2012

The Sydney LEP 2012 came into effect on 7 January 2013. The 'Sydney Harbour Bridge Approaches Group including pylons, pedestrian stairs and access roads' is listed as a heritage item on Schedule 5, Part 1 of the Sydney LEP 2012 (Item No 1539*). The 'Millers Point/Dawes Point Conservation Area' is listed on Schedule 5, Part 2 of the Sydney LEP 2012 (C35).

g) North Sydney Local Environmental Plan 2013

The 'Sydney Harbour Bridge North Pylons' (Item No 10541) and the 'Sydney Harbour Bridge approach viaducts, arches and bays under Warringah Freeway' (Item No 10530) are identified as heritage items on Schedule 5 of the LEP.

Other items listed in the North Sydney LEP, within the SHB heritage curtilage, are:

- Bradfield Park (including northern section), Alfred Street South (Item No. 10538)
- Milsons Point Railway Station group (10539)
- Milsons Point seawall and wharf site (Item No. 10540).

^{2.} On 1 July 2013, two new railway organisations were formed - Sydney Trains and NSW Trains. Sydney Trains are the operator of rail infrastructure and passenger rail services across the SHB, and its staff are responsible for the day-to-day upkeep and management of the place. Sydney Train maintenance staff will provide services for the maintenance of the rail asset, while Sydney Trains heritage specialists will provide professional advice and services to assist with its heritage management. At the time of writing, Railcorp remains the owner of the rail property.

h) Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 (NSW)

As of 1 July 2009, Regional Environmental Plans (REPs) are no longer part of the hierarchy of environmental planning instruments in NSW. All existing REPs are now deemed State Environmental Planning Policies (SEPPs).

From 1 July 2009, Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 (NSW) is taken to be a SEPP (see Clause 120 of Schedule 6 of the EP&A Act).

The 'Sydney Harbour Bridge, including approaches and viaducts (road and rail)' is listed as a heritage item on Schedule 4, Part 2 of the Sydney Regional Environmental Plan 2005 (Item No. 67).

1.3.2 Non-statutory listings

The SHB was included on the Register of the National Estate (RNE); however, the RNE was closed in 2007 and is no longer a statutory list. The RNE was originally established under the *Australian Heritage Commission Act 1975* (repealed) and was maintained by the *Australian Heritage Council under the Australian Heritage Council Act 2003* (Cwlth). The RNE is now a publicly available archive and educational resource for more than 13,000 places throughout Australia.

The SHB is also included in the Register of the National Trust of Australia (NSW) (Listing ID C6075). The register is a list of landscapes, townscapes, buildings, industrial sites, cemeteries and other items or places which the National Trust of Australia determines as having cultural significance and worthy of conservation. Currently, there are approximately 12,000 items listed on the register. In 1988, the SHB was declared an International Historic Civil Engineering Landmark during an official visit by a delegation from the American Society of Civil Engineers (ASCE). The ASCE plaque is fixed to the eastern wall of the southeast pylon tower adjacent to the entrance to the pylon tower lookout. At the same time, the SHB was declared a National Engineering Landmark under the Australian Historic Engineering Plaquing Program managed by Engineering Heritage Australia. This plaque is fixed to the parapet wall opposite the eastern doorway that leads to the pylon tower lookout.

1.4 Methodology and terminology

This updated CMP has been prepared having regard to the methodology outlined in the *NSW Heritage Manual* guidelines for the preparation of Conservation Management Plans (NSW Department of Urban Affairs and Planning and the Heritage Council of NSW, November 1996, as amended July 2002). It also follows the approach set out in *The Conservation Plan*, by James Semple Kerr (National Trust of Australia (NSW), seventh edition, 2013) and the *guidelines of The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance 2013* (the Burra Charter).

Conservation terminology used in this report is consistent with the *NSW Heritage Manual*, prepared by the NSW Heritage Office, and the Burra Charter. Definitions of the terms used in this report are included in Table 1.1 below.

Technical terminology used in this report is outlined in table 1.2 and illustrated in Figure 1.6.

Table 1.1 Conservatio	n terminology	used in	this	report
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Item	Discription
Adaptation	Changing a place to suit the existing use or a proposed use.
Association	The connections that exist between people and a place.
Conservation	All the processes of looking after a place so as to retain all its cultural significance.
Cultural significance	Aesthetic, historic, scientific, social or spiritual value for past, present or future generations.
Compatible use	A use that respects the cultural significance of a place. Such a use involves no, or minimal impact on cultural significance.
Fabric	All physical material of the place, including elements, fixtures, contents and object.
Interpretation	All the ways of presenting the cultural significance of a place
Maintenance	The continuous protective care of a place and its setting. Maintenance is to be distinguished from repair which involves restoration or reconstruction
Meanings	Deonte what a place signifies, indicates, evokes or expresses to people
Place	A geographically defined area. It may include elements, objects, spaces and views. Places may have tangible and intangible dimensions.
Preservation	Maintaining a place in its existing state and retarding deterioration.
Reconstruction	Returning a place to a known earlier state and is distinguished from restoration by the introduction of new material.
Related place	A place that contributes to the cultural significance of another place
Related object	An object that contributes to the cultural significance of a place, but is not at the place.
Restoration	Returning a place to a known earlier state by removing accretions or by reassembling existing elements without the introduction of new material.
Setting	The immediate and extended environment that is part of or contributes to its cultural significance and distinctive character.
Use	The functions of a place, including the activities and traditional and customary practices that may occur at the place or are dependence on the place.

Table 1.2 Technical terminology used in this report.

Item	Discription
Item	Description
Abutment	The structure built to support the lateral pressure of an arch or span. For the SHB this is the terminal end of the approaches where the steel approach spans commence.
Approach spans	Series of steel trusses on piers supporting the deck from the pylons to the approaches.
Approaches	Rendered concrete viaducts at the northern and southern extremities of the bridge.
Arch chord	Large steel box section forming the upper and lower members of the arch trusses.

Item	Discription
Arch truss	A structural frame with members in the vertical plane, supporting the main loads on the bridge.
Art Deco	A style originating in the 1920s in Paris, characterised by geometrical decoration and the use of eye-catching materials.
Balustrade	A row of balusters with a rail on top, but used in context of the bridge for any railing of handrail height beside a stair or walkway.
Battered	Inclined to the vertical (of walls).
Bearing	Main bearing: steel pivot supporting and allowing movement at the base of the arch.
Blockhouse	Small concrete enclosures (four in total) with square windows on top of each pylon tower. May also refer to concrete structure to the north of the original Toll House built in 1941.
Cantilever	A projecting bracket. A cantilever bridge spans by balancing two arms either side of adjacent piers.
Catwalk	A narrow passageway or platform for maintenance access.
Cross girder	Main trusses spanning in an east-west direction between the hangers and supporting the deck.
Dead load	The weight of the structure itself.
Deck	Platform slung under the arch supporting the road and railway.
Diagonal	Inclined member of an arch truss.
Dressed stone	Stone worked to a smooth finish.
End post	One of the four vertical posts supporting the ends of the arch trusses (known also as 'king post' but 'end post' is the correct term).
Expanded metal	A mesh manufactured by cutting a pattern of slits in metal and opening up the holes.
Gantry	Moveable framework or platform, used for bridge maintenance Hanger Vertical member, suspending the deck structure from it.
In situ	In its original position.
Joist	Steel member supporting the arch trusses.
Joist laterals	Floor laterals: members of deck structure spanning in an east-west direction.
	Arch laterals: Members of the arch connecting the eastern and western.
Live load	Loads imposed upon the structure (usually moving loads).
Mezzanine	A floor inserted inside a building volume.
Panel	The portion of the arch truss between one pair of vertical members (the arch has 28 panels).
Parapet	A low wall at the edge of a roof or change in level.
Pier	Granite faced concrete structures supporting the southern and northern approach spans.
Pilaster	A shallow pier or rectangular column projecting only slightly from a wall.
Portal frame	A frame constructed with rigid joints and hence no need for diagonal bracing.

Item	Discription
Pylon	Granite faced concrete structures either side of the steel arch, up to deck level. (The portion above the deck is the pylon tower)
Pylon towers	The upper parts of the pylon structures that protrude above deck level.
Retaining wall	A wall designed to support and retain a weight of earth filling behind it.
Rendered	Plastered externally with cement/sand render.
Rock faced	Masonry appearing rough-hewn and straight from the quarry.
Rusticated pilaster	A pilaster whose shaft is interrupted by plain or textured blocks.
Security fence and suicide fence	Fencing that is not original, generally consisting of steel mesh, in some cases mounted on top of the original fences to extend their height. These fences generally have a curved top with three rows of barbed wire. Also includes non-original steel paling fencing.
	Suicide fencing is the security fencing located along the eastern and western sides of the bridge, installed to prevent people from jumping off the bridge.
Spandrel	The triangular space between the arch, the horizontal drawn from its apex and the vertical of its springing. The SHB is termed a spandrel-braced arch because the bottom chord takes most of the load and the truss (or spandrel) above braces it.
Steel lattice fencing	Steel lattice fencing is the original fencing/balustrade, nominally one metre in height, comprising steel framing supporting riveted steel slats forming a lattice.
Stringer	Steel beam spanning between cross girders under deck.
Transom	A large sleeper used to support railway tracks without the need for ballast.
Viaduct	Elevated structure consisting of a series of spans carrying the elevated roadway or railway.

1.5 Limitations

For the purpose of the application of the conservation policies of the plan, the study area for this CMP is generally limited to that established as the SHR curtilage. This includes land and elevated bridge structure owned by the NSW State Government (Transport for NSW and PNSW) and local councils, including land and premises subject to commercial lease.

It should be noted that the heritage curtilage of the SHB as defined by its listing on the SHR and NHL excludes the Toll House (adjacent to the southern Bridge Stairs) and a portion of land in Bradfield Park (immediately south of Milsons Point station). As these areas contribute to the heritage value of the bridge, they have been addressed in Volumes 1 and 2 of this CMP and the conservation policies may apply to these areas as well. Transport for NSW and North Sydney Council may consider including these areas on the above heritage lists in the future.

1.6 Author identification

The CMP has been updated by Julian Siu, Senior Associate and Anna Simanowsky, Associate, with input and review provided by Abi Cryerhall, Principal, and Peter Romey, Special Advisor, of GML Heritage (GML). Assistance was provided by Melissa Moritz, Heritage Consultant, and Annabelle Widjaya, Graduate Heritage Consultant.

Updates to Volume 2 of the CMP, *The Conservation Management Plan – Inventory Records* (Artefact Heritage Pty Ltd, 2015) was undertaken by GML as part of the update of the 2018 CMP. The Inventory



Figure 1.1 Steps to follow prior to carrying out works that would affect the SHB.

Records were originally prepared by the Heritage Group, Department of Public Works and Services in 1997, and revised by Artefact Heritage Pty Ltd in 2015.

The following is a list of previous CMPs prepared for the SHB:

- Sydney Harbour Bridge Conservation Management Plan - Volume 1, GML Heritage Pty Ltd, prepared for Roads and Maritime Services, October 2015 (DRAFT)
- Sydney Harbour Bridge Conservation Management Plan - Volume 2, Artefact Heritage Pty Ltd, prepared for Roads and Maritime Services, November 2015 (DRAFT)

- Sydney Harbour Bridge Conservation Management Plan, Godden Mackay Logan Pty Ltd, prepared for Roads and Maritime Services, March 2013 (DRAFT)
- Sydney Harbour Bridge Conservation Management Plan, Godden Mackay Logan Pty Ltd, prepared for NSW Roads and Traffic Authority, February 2007
- Sydney Harbour Bridge Conservation Management Plan, Heritage Group, Department of Public Works, prepared for NSW Roads and Traffic Authority, March 1998

1.7 Acknowledgements

GML acknowledges the assistance of the following people in the preparation of this CMP:

- Daniel Percival, Environment Officer (Heritage), Environment Branch, Transport for NSW;
- Peter Mann, Strategic Infrastructure Manager, Transport for NSW; and
- Libby Percival, Heritage Specialist, Sydney Trains.



Figure 1.2 Sydney Harbour Bridge location plan. (Source: GoogleMaps 2018)

(Source: GoogleMaps 2018)



Figure 1.3 State Heritage Register listing boundary for the Sydney Harbour Bridge.

Source: Heritage NSW, Graphics: GML 2013)



Figure 1.4 Sydney Harbour Bridge, National Heritage List, listing boundary

(Source: Department of Agriculture, Water and the Environment, 2018)



Figure 1.5 Plan showing the buffer zone for the World Heritage Listing of the Sydney Opera House

(Source: World Heritage List nomination document)



Figure 1.6 Illustration of technical terminology used in this CMP.

(Source: Transport for NSW)

2. Historic development

2.1 Pre-European occupation

Before the arrival of Europeans in 1788, both sides of Sydney Harbour (where the SHB would later be built) were the homes of the Gadigal or Cadigal people and the Cameragal people. Both clan groups are located within the Eora Nation.

The word Eora means 'here' or 'from this place' and was the word used by the coastal Aboriginal people around Sydney to describe their geographical origins to the British. The word was adopted to define the coastal Aboriginal people themselves and is used today by their descendants.¹ The territory of the Eora people spread along the Sydney coastline to the Hawkesbury River in the north, the Georges River to the south and the Nepean in the West.² The Gadigal's land was located on the south side of the harbour, occupying the area of the city. The Rocks and down to the north shore of Botany Bay; while the Cameragal were located on the north shore, hugging the coast, including Milsons Point. At the arrival of the First Fleet in 1788, there were at least 1500 Aboriginal people living along the coast and harbour (with up to 3000 to 5000 by some estimates), distributed in family and clan groups.

The earliest recorded Aboriginal site in the Sydney region has been dated to approximately 15,000 years before the present, although it is likely that people were living in the Sydney region earlier than this, based on evidence from other sites in southeastern Australia.³

The members of both groups were coastal people; reliant on the harbour for food, fishing from canoes and taking shellfish and other edibles from the shoreline. It was the members of both the Gadigal and Cameragal people that bore the brunt of the arrival of the First Fleet, with their lifestyle and communities being disrupted and dislocated almost immediately from January 1788. An outbreak of smallpox (or similar contagion) in the Aboriginal community in early 1789 had a serious impact on the Aboriginal population in the immediate zone of European settlement; and while numbers recovered over the next few years, the population of Aboriginal people in the Sydney area was in general decline.⁴ By the 1820s the number of Aboriginal people living a traditional lifestyle within the vicinity of the growing town of Sydney had been reduced to a remnant of the former numbers.

2.2 Dawes Point Battery

With the arrival of the First Fleet in 1788. work commenced on the establishment of a settlement on the southern shore of Sydney Cove. Trees were cleared and the ground levelled by convict labour for the erection of the Governor's temporary house, the marguee of the officers, tents for the soldiers and shelters for the convicts themselves. In general, the freshwater stream running to the cove, later called 'the Tank Stream', divided the new settlement between the official buildings of the Governor and his officials, and the living areas of the convicts, the barracks of their military guards and the hospital on the western side of the stream and rocky western shore of the cove.

After the Governor's house, one of the first structures erected was a temporary shelter for the observatory of Lieutenant William Dawes. The timber shelter was built on the western headland of the cove, known by the Aboriginal people as Tarra, but renamed

^{1.} Heiss, A and Gibson, M-J, Aboriginal People and Place, Barani: Sydney Aboriginal History, viewed 8 August 2017, http://www.sydneybarani.com.au/cites/aboriginal_people_apple.com

<sup>sites/aboriginal-people-and-place/>.
Madden, C, Welcome to Country, The Sydney Culture Essays, 2017, viewed 9 August 2017, http://sydneycultureessays.org.au/introduction/welcome-to-country.</sup>

Attenbrow, V 2002, Sydney's Aboriginal Past, UNSW Press, Sydney, p 153.
 Curson, PH 1985, Times of Crisis: Epidemics in Sydney 1788–1900, Sydney University Press, Sydney, p 49.

by Europeans to 'Point Maskelyne' after the then Astronomer Royal, and subsequently further renamed as 'Dawes Point'. This initial observatory was a two-storey timber building with rotating roof on the upper level, and situated on a cleared rock platform, with stone cut to provide stability for the instruments.⁵

In 1789 work began on a replacement building for the observatory, built of stone quarried on the site. Dawes continued to take observations, among other duties, from the observatory, including weather and meteorological data, until he returned to England in November 1791.

By this time Dawes Point had already begun to be used by the military. In 1789 a powder magazine was under construction, joined by a signal station in 1790. Following Dawes' departure, it is unclear what became of the observatory buildings, but the site was designated for use by the military. By this time a small battery had been established for defence of the settlement at Dawes Point, with five cannons taken from the HMS Sirius.6

Between 1791 and 1799, little new development took place on Dawes Point. With no artillery officer in the colony following the return of the marines (who had arrived with the First Fleet) to England in 1791, the battery fell into disuse. In 1798 Governor Hunter ordered a review of the colony defences and an upgrade of the redoubts in Sydney. Between 1799 and 1817, work to upgrade the battery was undertaken by successive governors. It remained, however, a small complex used largely for ceremonial occasions.7

In 1819, Governor Macquarie assigned convict Colonial Architect, Francis Greenway, the task of upgrading Dawes Point. From 1820 up until the 1870s, Dawes Point Battery was largely rebuilt and upgraded, with expansions to fit new guns, the addition of barracks and guardhouses, as well as

a lower battery down the slope from the main fort (Figures 2.1 and 2.2).

Figure 2.1 Dawes Point Battery, demolished to make way for the SHB.



(Source: City of Sydney Council Archives CRS 51/363)

Figure 2.2 The guns of Dawes Point Battery.



(Source: Mitchell Library GPO1-14011)

Dawes Point Battery was one of a chain of inner harbour defences built during the nineteenth-century to counter perceived threats from Britain's European rivals, most notably the French and the Russians. By the 1880s, however, with larger forts and batteries built at Middle Head, North Head and other outer harbour locations. Dawes Point was used more for accommodation of administrative offices and residences than for defence. From 1909 until 1924, the site was used by the Water Police, with accommodation in the former Officers' Quarters on the northwest side of the Point. Part of the building was also in use by the Repatriation Department as a trades school

Johnson, AW 1995, Dawes Point Battery Archaeological Excavations Volume 1, prepared for the Sydney Cove Authority. ibid.

between 1918 and 1924 to retrain returned servicemen from World War I.

Between 1924 and 1932, with work beginning on the construction of the SHB (which would ultimately pass directly over the top of the site of the battery), the offices of Dorman and Long were located in the Trades School buildings and former Officers' Quarters. Following the bridge construction, the remaining buildings on site were demolished and the area landscaped as a park. In 1995 (and again in 1999 and 2000), the site was excavated in an archaeological dig undertaken by the Sydney Cove Authority, revealing the foundations of a number of the buildings, as well as the gun positions, powder magazine and associated features. These have since been incorporated into a redesign of the park to commemorate the site's association with Australia's colonial history.

2.3 Planning the Sydney **Harbour Bridge**

2.3.1 Before the Sydney Harbour Bridge

Prior to construction of the SHB, the guickest way to journey to the north shore from the city was by water. The first ferry service was established in 1816 by an emancipated convict, Billy Blue, who sailed between Millers Point and Blues Point.⁸ The other route into northern Sydney was by road, along a track that ran around the headwater of Parramatta River.9

The ferry service developed to become a regular and reasonably reliable mode of transport. By the 1840s, coal-powered steam punts that could carry a horse and cart were making the trip across the water of Sydney Harbour from Dawes Point and Millers Point in the city to Milson Point and Blues Point on the north shore. Other services were introduced from the 1850s

onwards to travel from Circular Quay to Milsons Point by Kirribilli and Mosman by Neutral Bay.¹⁰ In 1884, all night ferries were introduced and travelled between Circular Quay, Milsons Point, McMahons Point and Lavender Bay. After a tramline was constructed between North Sydney train station and Milsons Point in 1886, Milsons Point became the main ferry terminal on the north shore due to easier access (the main ferry terminal was previously located at Lavender Bay).¹¹

People who were required to move large items that could not be carried on a small boat had to continue to travel overland. A series of bridges were constructed along the harbour shoreline and a land route between the city and the north shore, known as the 'Five Bridges', was established by the 1880s. The bridges were located at Pyrmont, Glebe Island, Iron Cove, Gladesville and Fig Tree and took 20 kilometres off the old Parramatta Road route.

Travelling by ferry continued to be the preferred option and, by 1890, the ferries were carrying 5 million passengers, 378,500 vehicles and 43,800 horsemen a year. In 1908, a Royal Commission found that the ferries were taking 13 million passengers a year across the harbour and Circular Quay was lined five boats deep with up to 75 boats an hour waiting to dock.¹²

In 1932, more than 40 million people were travelling across Sydney Harbour by ferry. When the SHB was opened for traffic in the same year, the Milsons Point passenger ferry services were terminated.13

2.3.2 Early proposals

Throughout the nineteenth century, proposals had been mooted for the construction of a bridge to link the northern and southern shores of Sydney Harbour. As early as 1815, Francis Greenway had

Park, M 2002 'Taking the Ferry: Ferry Services and Travel on the North Side from the Days of the Watermen to the Opening of the Sydney Harbour Bridge' Heritage Leaflet Series 34, North Sydney Council, pp 10-11. 10.

Lalor, P 2005, The Bridge: The Epic Story of an Australian Icon-The Sydney Harbour Bridge, Allen & Unwin, p 35. Wedgwood, R and C Mackaness, 'An Engineering Marvel' in Mackaness, C (ed.) 2006, Bridging Sydney, Historic Houses Trust of NSW, p 56.

¹¹ Andrews, G 1986, A Pictorial History of Ferries: Sydney and surrounding waterways, A H & A W Reed, pp 13-17.

Lalor, op cit, pp 36-37 12. Lalor, op cit, pp 50-5 13. Park, op cit, pp 10-11.

suggested to Governor Macquarie the construction of a bridge across the harbour and returned to the idea in 1825. In a letter published in The Australian, Greenway wrote:

Thus in the event of the bridge being thrown across from Dawes' battery to the North Shore, a town would be built on that Shore; and would have formed with these buildings, a grand whole, that would indeed have surprised anyone on entering the harbour; and have given an idea of strength and magnificence that would have reflected credit and glory on the colony; and the mother country...¹⁴

While this had never formed into anything bevond an idea, it was the first plan of many to come.

The first known plan of any proposal dates from 1857 when Engineer, Peter Henderson, proposed the construction of a vast cast iron bridge, spanning from Dawes Point to Milsons Point. The bridge was to be supported by two pylons, one on either side of the harbour. Henderson's proposal was followed in 1878 by a proposal for a floating bridge by Commissioner WC Bennett; and in 1879 by a high-level bridge designed by TS Parrott. Parrott's plan included a series of piers on either side of the harbour and two larger piers positioned in the harbour,

supporting the roadway above. A plan by JE Garbett was actually accepted by the government in 1881 but never implemented. John Fowler, who had been involved in the building of the Firth of Forth Bridge in Scotland, proposed a suspension bridge to cross the harbour. A tunnel was also suggested around the same period.¹⁵

Enough public interest had been raised by 1890 for a royal commission. The hearing examined eight schemes, including a tunnel, and set out a list of criteria for any future proposed harbour crossing. These criteria included a requirement for a highlevel bridge with one clear span over the waterway (Figure 2.3). The bridge to span from Dawes Point to Milson Point was variously referred to as the North Sydney Proposed Bridge, North Shore Bridge and Sydney Harbour Bridge.¹⁶

Nothing further came of the ideas until 1900, when a design competition was called by the Minister for Works, EW O'Sullivan, and the Sydney Harbour Bridge Advisory Board was formed. From this point, the bridge became known as the Sydney Harbour Bridge, while also being referred to as the North Shore Bridge, and the visionary civil engineers JJC Bradfield became involved for the first time.¹⁷



Figure 2.3 A proposed design for the North Shore Bridge in 1894.

(Source: Mitchell Library PXD 318/4)

¹⁴

^{15.}

Greenway, F H, 'Advertising', The Australian, 28 April 1825, p 4, viewed 9 August 2017, http://nla.gov.au/nla.news-article37074527. Fraser, D (ed), Sydney: From Settlement to City, Engineering Heritage Committee, Institution of Engineers, Sydney, p 111. Mackaness, C, Butler-Bowdon, C, and Gilmour, J, 'An Illustrated Chronology of Events, 1789–1932' in Mackaness, C (ed.) 2006, Bridging Sydney, His-toric Houses Trust of NSW, p 84, 85 and 89. 16

^{17.} ibid, p 92.

2.3.3 John Job Crew Bradfield

By the time John Job Crew (JJC) Bradfield began working on the SHB, he was already an accomplished and recognised civil engineer. Born in Queensland in 1867, Bradfield gained a medal for chemistry at senior school matriculation and the University Medal for Engineering at Sydney University in 1889. His first work experience was as a draftsman under the Chief Engineer of Railways in Brisbane. In 1891 he was retrenched and moved to Sydney to begin work with the Roads and Bridges Branch of the NSW Department of Public Works as a temporary draftsman. Bradfield became an associate of the Institution of Civil Engineers in London and graduated first-class honours with his second University Medal in 1896. He later received the first Doctorate of Science in Engineering from Sydney University for his thesis on the design and construction of the SHB and the city railway system in 1924. During his time at Sydney University, he also founded the Sydney University Engineering Society in 1895, serving as its president in 1902-1903 and again in 1919-1920.18

Between 1891 and 1911. Bradfield was involved in a wide range of engineering projects, including work on the Cataract Dam near Sydney and Burrinjuck Dam in the Murrumbidgee Irrigation Area. Although initially slow to advance through promotion in the NSW Public Works Department, by 1911, Bradfield was Principal Designing Engineer and was checking the designs being submitted to a succession of inquiries regarding the harbour crossing. Bradfield himself was asked to design a bridge that would not impede navigation, and submitted three—a cantilever, a suspension and a cantilever arch combination-recommending the cantilever design. His arch design was yet to be formulated.¹⁹ In 1912, Bradfield was appointed as Chief Engineer, Sydney Harbour Bridge, City Transit and Metropolitan Railway Construction.

This began a formal 20 year association with the development of a harbour crossing and the associated city rail network that linked to it. In 1926, Bradfield was praised in the annual report of the Town Planning Association of NSW for his vision for Sydney:

The name of Dr. J. J. C. Bradfield will be associated for all time not only with the conception and planning for Sydney Harbour Bridge and the City Electric Railway, but for stimulating the imagination of the people to think of Sydney as a City Beautiful and to realise its great future.²⁰

Bradfield was involved with the SHB project from close to its inception until the opening day in 1932. In 1933 Bradfield retired from the public service. In the following year, he was appointed as consulting engineer for the design, fabrication and construction of a bridge across the Brisbane River, which was opened in 1940 as the Story Bridge. He was also appointed as technical advisor to the construction of the Hornibrook Highway, also in Brisbane, and helped in the design of the University of Queensland's St Lucia site.

Outside his project work, Bradfield was involved in a wide range of engineering societies and associated groups. He was a founder of the Institution of Engineers, Australia, in 1919: and represented it on the Australian Commonwealth Standards Association in 1927. He was a member of the Australian National Research Council and maintained continual close links with the University of Sydney. Bradfield was also recognised both nationally and internationally for his contribution to civil engineering, being awarded the Sir Peter Nicol Russell Medal by the Institute of Engineers Australia in 1932; the WC Kernot Memorial Medal by the University of Melbourne in 1933; and the Telford Gold Medal of the Institution of Civil Engineers, London 1934.²¹

John Job Crew Bradfield, Australian Dictionary of Biography, online edition.

Fraser, op cit, p 112. Town Planning Association of NSW, 1926, Annual Report, cited in Historic Houses Trust, Sydney Harbour Bridge—Site Study Materials (Secondary), p 17. Australian Dictionary of Biography, op cit



Figure 2.4 The seven designs submitted by Dorman Long. The third from the top was chosen.

(Source: Lalor)

Figure 2.5 1904 Panorama of Bennelong Point, Circular Quay and Dawes Point, photographed by Melvin Vaniman.



(Source: NSW SL XV1 Har Circ 5)

2.3.4 The design

In November 1922, the NSW State Parliament passed the Enabling Act, clearing the way for the construction of a harbour crossing from Dawes Point to Milsons Point. Bradfield had been sent overseas to study bridge design prior to this, in March 1922, and had seen the newly completed Hell Gate Arch in New York, which rekindled an earlier plan of a single steel arch. Bradfield's idea was further reinforced when preliminary feasibilities showed an arch could save up to 10% on the cost of a cantilever bridge.²² Tenders were called in 1923 with specification set out by Bradfield. These included that designs were to be either cantilever or arch bridges, carry six lanes of traffic, four railway tracks (two on each side) and pedestrian footways (one on each side). The bridge was to link with the proposed city railway system and materials were to be sourced from New South Wales wherever possible.23

Twenty designs were received from six different companies, including a number of suspension bridges outside the specifications. The arch design of English firm Dorman Long and Co. Ltd was recommended by Bradfield and accepted by the government in February 1924 (Figure 2.4). The decision was announced in The Argus:

The State Cabinet, after nearly three hours deliberation, today decided to accept the tender of Dorman, Long and Co. for the construction of the Sydney Harbour bridge at a cost of £4,217,721 11s 10d. The bridge to be constructed is of the arch type, and is the one recommended by Mr. Bradfield in his report to the Ministry for Works and Railways (Mr. Hall) and by the Minister himself to the State Cabinet. The amount of the accepted tender is £111,809 less than the estimate of Mr. Bradfield, and is substantially less than the amount authorised by Parliament which, including an amount to cover the cost of buildings and resumptions, totals £6,325,000.24

2.3.5 Demolitions

To make way for the bridge and its approaches, large swaths of residential Sydney on the north and south side of the harbour were resumed and demolished (Figures 2.5 and 2.7). On the north side, 438 houses were resumed during the 1920s for the building of the bridge. At the time, a Sydney newspaper reported that each house had an average of 4.638 residents, making a total of 2032 people losing their homes.²⁵ As well as the houses, the shops, pubs and businesses in the neighbourhoods were

22. ibid, p 112

Roads and Traffic Authority, 1988, The Story of the Sydney Harbour Bridge, RTA, Sydney, p 6.
 SYDNEY HARBOUR BRIDGE.'. The Argus, 27 February 1924, p 19, viewed 15 August 2017, http://nla.gov.au/nla.news-article1930675>.

^{25.} Lalor, op cit, p 114.

also removed. While owners of houses and businesses could get some compensation, most of the houses were in fact occupied by tenants, who were simply evicted. The demolition on the north shore was documented in large part by the Reverend Frank Cash, Rector of Christ Church at Lavender Bay. When Reverend Cash was alerted to demolitions by residents, he would grab his camera, make his way to the street in question and photograph the demolition work. Reverend Cash used the demolitions and evictions in his sermons.²⁶

Figure 2.6 Buildings in Alfred Street, North Sydney being demolished.



(Source: Stanton Library LH REF PF 1059/5)

Figure 2.7 Princes Street, The Rocks prior to demolition.



(Source: State Records 12685/8724000021)

On the southern side, the story was the same. Here, the approaches came through The Rocks. Sydney's oldest suburb, The Rocks, was only just recovering in the 1920s from demolitions, evictions and disruptions caused by the plague, which had been detected in the suburb in 1901. Most of The Rocks area had been resumed by the government after the plague and so any new resumptions for the bridge were made easier due to a lack of private owners. As with the northern side, hundreds of homes and businesses in The Rocks were demolished and many of the residents moved away from the area. Princes Street, which ran along the ridge between The Rocks and Millers Point, and had once been one of Sydney's most fashionable addresses, was lost forever under the southern approaches (Figure 2.7). The approaches to the bridge partially separated Millers Point and The Rocks. Most of the Dawes Point Battery was demolished in 1925 to make way for the construction of the SHB.

2.4 Building the Sydney Harbour Bridge

2.4.1 Preparing for construction

The first sod of the construction of the SHB was turned at the site of the future North Sydney Railway Station on 28 July 1923 by the Honourable RT Ball, Secretary for Public Works and Minister for Railways and State Industrial Enterprises.²⁷ The same day, a land tax previously promised was levied to assist in payment for the bridge project. Both events took place before a final tender had been chosen; however, they were seen as confidence boosters and assurances that a tender would soon be accepted.

Work on the approach ways from the north and south carried through 1923 and 1924, prior to the signing of the final contract for the bridge proper. The approaches were designed and built by the Sydney Harbour Bridge Branch of the Public Works Department and the Metropolitan

Park, M 2000, Building a Bridge for Sydney: The North Sydney Connection, Historical Services Department, North Sydney Council, p 11.
 'HARBOUR BRIDGE.', The Sydney Morning Herald, 26 July 1923, p 10, viewed 15 August 2017, http://nla.gov.au/nla.news-article16083185.

Railway Construction Branch of the NSW Government Railways. Construction began at North Sydney with the excavation of tunnels for the railway, followed by bridges over Euroka, Bank, Fitzroy, Burton, Lavender and Arthur Streets (completed between 1924 and 1929); and retaining walls of stepped section concrete being built at Broughton and Alfred Streets, the Bradfield and Pacific Highways.²⁸ Fill for the construction of the roadway and approaches were provided on the north side by the excavated material from the North Sydney railway site and tunnelling operations.

On the southern approaches, work began from Wynyard Station in 1928, with open excavation and flat top construction (for roadways), although demolitions in The Rocks had begun some years prior to this. The only span within the southern approach was over Argyle Street, where an arch bridge crosses the Argyle Cut. Ornamental retaining walls and stairs for pedestrians were constructed in Cumberland Street, with a foot tunnel to Upper Fort Street also provided.

The tender process to construct the bridge itself had been extended on the request of a number of companies involved and due to the sudden death of the Managing Director of Cleveland Bridge and Engineering Company, the leading tenderer. Dorman Long and Co. Ltd, an English Engineering firm, took over the Cleveland Bridge tender at the request of the Cleveland Bridge and Engineering Company Engineer, Mr Ralph Freeman (Freeman was appointed consulting engineer to Dorman Long for the SHB project).²⁹ Tenders eventually closed in January 1924 and on 24 March 1924, Dorman Long signed the contract for the construction of the SHB.

With the contract signed, work on the bridge itself began in earnest. Dorman Long brought 20 men from its London office to Sydney, including their Director of Construction (Lawrence Ennis) and their

principal engineers; and established their site office in the former barracks at Dawes Point Battery. The fabrication workshops were constructed on the north side of the harbour on railway land at Milsons Point (now the site of Luna Park-Figure 2.8) and the NSW Government quarry at Moruya (which had been closed) was re-opened for the extraction of granite to be used in the piers and pylons. Dorman Long placed orders with the State Dockyard in Newcastle for three iron steamers to transport granite from Moruya in July; and in the same month, a new train, tram and ferry terminal was opened at Milsons Point to replace the old terminals which were to be demolished

Figure 2.8 The workshops at Milsons Point with the beginnings of the arch behind.



(Source: State Records)

Figure 2.9 Preliminary framework for the southern pylon at Dawes Point. The twostorey building on the left was the Dorman and Long offices.



(Source: Mitchell Library DG ON4/ 2237)

Heritage Group, Department of Public Works 1998, Sydney Harbour Bridge: Conservation Management Plan, prepared for Roads and Traffic Authority of New South Wales, p 35.
 Lalor, op cit, p 16.

Figure 2.10 Piers 4 and 5 in 1929 on the southern side, faced in Moruya granite.



(Source: State Records 12685/8727000080r)

Figure 2.11 Inside the pylon during construction.



(Source: State Records)

Work began at Moruya on 1 December 1924 with the construction of a wharf, powerhouse with water supply, stone dressing sheds with overhead cranes, and a stone crushing and screening plant. In addition, standard gauge railway tracks were laid for two locomotive steam cranes and a narrow gauge track for two petrol driven engines and tip trucks.³⁰

In January 1925, Dorman Long began excavating at Dawes Point and built a ramp from George Street north to haul materials up from the wharf below. The foundation stone for the SHB was laid in the location of the Southern Pylon on 26 March 1925, in the presence of the NSW Premier, Sir

Heritage Group, op cit, p 35.
 Lalor, op cit, p 162.

George Fuller, all his department heads and ministers, and Dorman Long's Sir Arthur Dorman and Sir Hugh Bell. On the same day, the first goods train of materials for the SHB also arrived at North Sydney.³¹

By the end of March, the first shipment of steel had arrived from England and work to erect the fabrication workshops got underway. Two wharves were constructed in Lavender Bay where the steel was unloaded into a stockyard which contained angle benders, saws and croppers; before it was moved, via crane and light rail, first to the light workshops where it was straightened or cut to length as required. Above the workshops was the template loft where the templates for the bridge pieces were created. The steel was taken from the light workshops to the marking-out bay, and then to the drills for the holes needed for rivets and screws to be drilled through. From here, the pieces were transported to the heavy workshop where the steel was painted and then the pieces assembled into sections. The sections, most measuring up to 50 metres in length and weighing 100 tonnes, were then transported via overhead gantry crane to pontoons for transport out to the SHB site.³²

The workshops were filled with specifically designed machines, each playing an important part in the overall production process. The light workshop had a cutting and edging machine over 20 metres long; the guillotine cutters in the stockyard, cutting steel up to 54 millimetres thick, could reputably be heard in Manly on a calm day; whilst amongst these, gangs of riveters and other construction workers went about the business of working the machines and putting the pieces together. Conditions were hot and incredibly noisy throughout the Lavender Bay workshops.

2.4.2 Construction of the bridge

As the approaches advanced from north and south towards the harbour, five-tonne steam locomotive cranes advanced with

^{31.} Lalor, op 6 32. ibid, p 34.

them, erecting temporary timber trestling to support the steel work. Behind each small crane was a larger electric crane of 25 tonnes, which lifted the steel into place. The cranes moved forward on the approaches as they were constructed, stopping as they reached the site for each pier, which they also helped erect.

While the approaches were being constructed, the pylons were also being built. Constructed on reinforced concrete, the pylons include the four main bearings mounted on the abutments at the base of the lower cord of the bridge: two at Milsons Point and two at Dawes Point. The bearings take the thrust of the arch, transmitting the pressure directly to the ground where the load is spread through an area of 68 by 49 metres, excavated to a depth of 19.2 metres to solid rock and then filled with hexagonal shaped concrete blocks to the base of the pylons³³ (Figures 2.9–2.11).

Figure 2.12 Constructing the pylons above the road deck, with the creeper crane returning to its start position, 1931.



(Source: State Records 12685/8731000120r)

33. ibid, p 37. 34. ibid, p 39 Figure 2.13 One of the two creeper cranes, returned to the base towards the end of the arch construction. The two cranes were critical to the construction.



(Source: State Records 12685/8731000151r)

Figure 2.14 Creeper crane moving along the arc of the SHB.



(Source: City of Sydney)

The pylons, like the piers, have their concrete structure faced with granite from Moruya. The concrete was mixed by a gang of six men only for each side of the harbour and poured by another gang of six men for each tower. Each gang placed the reinforcement, poured the concrete and packed it by hand with rods. In total each gang poured and packed a total of 95,000 cubic metres.³⁴ Once the towers reached 47 metres above ground level, reinforced concrete floors were created to build and launch the creeper cranes which would be used to build the bridge's arch (Figures 2.12 and 2.14).

Figure 2.15 Closing the arch as seen from North Sydney. The dominance of the SHB in the Sydney skyline is clearly illustrated.



(Source: Mitchell Library DG ON4-2181)

Figure 2.16 Lifting steel from a harbour barge to the SHB site above.



(Source: Mitchell Library DG ON4/2211

Figure 2.17 Argyle Street Substation, photograph taken in 1989.



(Source: City of Sydney) 35. Roads and Traffic Authority, op cit, p 10. 36. ibid, o 11.

Like the cranes for the approaches, the two creeper cranes erected their own track, the arch itself, in front of themselves to advance. One creeper crane worked from each side of the harbour and they were critical elements of the SHB construction. The cranes were supplied by Wellman Smith and Owen Engineering Corporation of Great Britain, and were designed specifically to travel along the top of the arch, moving forward as each section of the arch was completed.³⁵ Each crane was in fact a collection of five cranes, grouped on a travelling frame, working together. The main crane consisted of a main hoist with a lifting capacity of 123 tonnes. Next was a 20-tonne jigger hoist to help control the heavy bridge members as they were erected. A five-tonne walking crane operated across the front of the girder of the creeper crane to lift working cages, while two 2¹/₂-tonne cranes operated at the back of the frame to assist in the riveting stages of construction.

Once the first section was assembled, the two creeper cranes began to move forward towards each other. To prevent slipping back, each unit was also fitted with a special braking system.³⁶

The erection of the arch began on 26 October 1928.

Each side of the arch was held by 128 steel cables, anchored into the rock through horseshoe shaped tunnels placed between the first and second piers on each side of the harbour. The cables obviated the need for any other supports to be built during the construction phase. As the halfarches moved towards each other across the harbour, the cables were tensioned to suit the increasing weight of the structure.

The arches were manhandled by the crews working on the bridge structure. As each piece of steelwork was fabricated, it was transported from the workshops via barge out onto the harbour, where the creeper cranes would lift it into position. Up on the bridge, teams of riveters, steel fabricators, carpenters, riggers, form-workers, boilermakers, labourers and other tradesmen all worked to put the bridge pieces together. Once work started, the bridge moved quickly forward. By August 1930 the two half-arches were ready to be joined. On 7 August the cables holding the giant arches back from each other were ready to be slackened. Before they were finally joined, a severe wind storm hit Sydney. With winds of over 110 kilometres per hour, the 15,000 tonne arches swayed (albeit only 7.5 cm) when less than one metre apart. Despite this excitement, at 4.15pm on 19 August 1930, the two spans touched for the first time. They briefly parted again as the cables contracted as they cooled, but were brought together finally at 10pm the same night.³⁷

The meeting of the halves was celebrated with a half-day holiday for the workers, a gold sovereign for those involved in releasing the cables and two shillings for everyone else to drink a toast to their achievement (Figure 2.15). The Western Argus described the event as:

To-day Sydney rejoiced, the Premier's Conference, the Depression and even Bradman's century were forgotten. In the early morning the Union Jack and the Australian ensign were flown from the masts erected at the head of the jib cranes which surmount the harbour bridge to tell all Sydney that the arms of the bridge had been joined and the huge archway of steel had been made a unit...

At 4 o'clock on Tuesday afternoon the two arms were brought together and about midnight last night the huge key pin 'of the lower chords was forced into position, locking the huge archway. Today, workmen were given a half holiday in appreciation of the loyal services and a few, privileged persons, including the interstate university debaters, were conducted over the bridge.

The first overseas liner, to pass beneath the completed arch was the Taiping, and the occasion was celebrated by the blowing' of several long blasts on the. whistle. Soon afterwards two outgoing vessels, the magnificent Nieuw Holland and S.S. Company's motorship, Mirrabooka, passed beneath the bridge. The Nieuw Holland flew the signal, "J.O.Y.," which is the international code for congratulations, and the Mirrabooka flew bunting, on both sides of her foremast as a tribute to the work of completion.³⁸

With the release of the cables, the arch underwent stress testing and final adjustments to bring the full load to bear on the two hinged bearings at the pylon bases.

As the two creeper cranes were now positioned in the middle of the arch, the construction of the deck and vertical hangers began from the centre and moved back towards the shorelines as the cranes returned to their starting positions. Each hanger section was lifted from a barge on the harbour directly below, using a special cradle which enabled them to be positioned underneath the arch, not directly accessible to the crane lifting cables (Figure 2.16). A rigger rode each section up from the harbour to fit it to the arch chord. The cradle also acted as a brace for the hangers as they were lifted from the harbour and fitted. Once the hangers were attached, the deck cross girders were placed, followed by diagonal bracing, stringers and steel troughing to take the roadway were formed. The construction of the hangers and deck took just nine months from the time the arch was closed.

In June 1931, the creeper cranes were dismantled and the remaining major tasks involved the completion of the pylons above the deck level and the surfacing of the deck with asphalt. The last stone, set in the northwest tower, was set on 15 January 1932 and the last rivet on the SHB was driven on 21 January. In February the SHB was test loaded. To undertake this, the four rail lines were packed with 72 locomotives placed buffer to buffer, and then shifted, moved and removed in different patterns to test

ibid, p 11.
 'SYDNEY HARBOUR BRIDGE', Western Argus, 26 August 1930, p 13 viewed15 August 2017, http://nla.gov.au/nla.news-article34503627>.

Figure 2.18 Premier Jack Lang opens the SHB by cutting the ribbon on the southern side. The Governor and other dignitaries look on.



(Source: Mitchell Library DG ON4/ 5282)

the stresses. The SHB passed its tests easily and was prepared for opening.

On completion, the SHB was the largest man-made structure in Sydney and towered over the surrounding low rise city.

2.4.3 Argyle Street Substation

The Argyle Street Substation was built as part of the SHB and is located on a plot of land above Trinity Road, to the west of the southern approach viaduct (Figure 2.17). This substation was designed to, and still does, supply electricity for the railway, all the lights, and the former tramway of the SHB.

The Argyle Street Substation was constructed in 1929–1930 by the Permanent Branch of the NSW Railways Department under RL Ranken, Engineer in Chief.³⁹ It is one of 15 substations constructed from 1926 to 1932 as part of the electrification of the suburban train network project. They were all built to a standard design and layout, consisting of the substation building, the switchhouse, transformers and surrounding electrical equipment, within an enclosed yard. The substation buildings are constructed in the Interwar Stripped Classical style, but the Argyle Street Substation is unique as its façade was cement rendered to match the SHB.⁴⁰

2.4.4 The opening

The SHB was officially opened on 19 March 1932 by the then Labor Premier Jack Lang (Figure 2.18). Lang's decision to personally open the SHB, instead of having the Governor, Governor-General or other dignitary perform the role, had caused some consternation amongst his political opponents and was seen as one more example of Lang's provocative leadership style. On opening day, as Lang began to make his opening address from the official dais, Captain Francis de Groot, a member of the right wing New Guard which was vehemently opposed to Lang and his apparent communist policies, dashed forward on a borrowed horse and slashed the ribbon with his sabre, declaring the SHB open on behalf of the decent and loyal citizens of New South Wales.⁴¹ The incident was reported by Hugh Buggy, a reporter for the Melbourne Herald:

39. Heritage Group, Department of Public Works and Services, Sydney Harbour Bridge Conservation Management Plan: Argyle Street Substation,

Inventory Sheet 5.4, p.1. 40. NSW Heritage Office, Argyle Street Railway Substation, SHR Listing 01022.

In the midst of glittering pageantry, and in spite of the vigilance of cohorts of police and detectives, the Premier of New South Wales (Mr Lang) was forestalled in the actual cutting of the ribbon across the approach of the Sydney Harbor Bridge on Saturday, March 19.

Swinging his sword aloft, a military officer, Captain F. E. De Groot, mounted on a prancing chestnut horse, slashed the wide blue ribbon in two places 10 minutes before the time appointed for Mr Lang to cut it with a pair of golden scissors.

First Captain De Groot sought to break the ribbon by pressing his horse against it. The horse took fright, however, and bounded back from the ribbon. The officer urged the horse forward again, and under the eyes of 50 policemen, who were taken by surprise, slashed the ribbon with his sword.

'I declare this bridge open in the name of His Majesty the King, and of all decent people,' shouted Captain de Groot, as his sword flashed in the sunlight.⁴²

De Groot's grand gesture was captured by the cameras of Cinesound but little noticed by most others on the day.43 The police reacted quickly, dragging him from his horse, and the ribbon was replaced with a spare, brought along in case of emergency. Although the de Groot incident was over in a matter of minutes, the fortuitous filming of the scene by Cinesound has meant that it is remembered as an integral part of the opening of the SHB and, more so, as part of the bridge's folklore. De Groot reappeared in pantomime form at the fiftieth anniversary of the opening, with a street performer riding in the parade dressed as a caricature of de Groot on horseback. The incident did, however, underline the simmering, and very nearly boiling, political tensions between the left and the right wings of New South Wales politics, exacerbated by the deepening economic depression in the early 1930s (Figures 2.19 and 2.20).

Figure 2.19 Francis de Groot's horse following his dramatic ribbon slashing and subsequent arrest.



(Source: Mitchell Library DG ON4/2143)

Figure 2.20 A caricature of De Groot returns during the anniversary celebrations in 1982. His actions on opening day are part of the SHB mythology.



(Source: National Library of Australia PIC/3992/1)

The official opening took place later the same morning, with Jack Lang cutting the ribbon at the southern end to open the SHB, and the Mayor of North Sydney cutting the ribbon at the northern end to signify entry into North Sydney.

Buggy, H. "Opens" Bridge With Sword!' Weekly Times, 26 March 1932, p 24, viewed 9 August 2017, http://nla.gov.au/nla.news-article223802617.
 ibid, p 312.

The Governor, Sir Phillip Game, unveiled the tablet which officially named the SHB. He stated to the crowds on that day:

Of the material wonders of the bridge I am not qualified to speak... but no one can live almost in its shadow without paying continual, even if silent, tribute to the marvels of design and workmanship which have fashioned by the hand of man a bridge which adds beauty and dignity to the works of nature around and about it...

I am now to have the honour of unveiling the tablet which names the great achievement, 'The Sydney Harbour Bridge' and the roadway linking the city with the northern suburbs, 'The Bradfield Highway'.⁴⁴

Once the dignitaries had completed their speeches and official duties, a pageant and parade of over 750 participants got underway from near the Observatory and made its way across the SHB. Consisting largely of horse drawn floats, the parade sought to depict the significant moments in our history. The parade was followed by marching contingents of school children, a token Aboriginal group, returned soldiers, scouts, bridge workers and lady lifesavers. Overhead planes flew a fly-past, while ships and ferries sailed beneath sounding their sirens. Behind the parade, the public was allowed to walk across the SHB for the first time. Tens of thousands of people walked across the roadway of the SHB until it was opened for vehicular traffic at midnight.

The opening day had attracted people from all across Sydney, New South Wales and beyond to witness the ceremony. Special trains had been advertised from Melbourne and Adelaide, bringing people to Sydney for the big day. Once there, tickets could be purchased to cross in the first train, and members of the public could send a commemorative telegram from one of two post offices in either the south and north pylons or buy commemorative stamps of the day.⁴⁵ These items were the first in a long line of souvenirs produced with an image of the SHB.

At midnight, the SHB was opened for traffic while the remainder of the week was Bridge Week, with ongoing celebrations.

2.4.5 The workers

During the construction of the SHB, through the design stage, in workshops, on the ground, in the quarries and on the structure, many thousands of workers had been directly or indirectly involved. Just about every trade had been employed, from boilermakers to carpenters, as well as engineers, architects, stone masons (a community of 300 lived at the quarries in Moruya), draughtsmen, joiners, riveters, secretaries, crane drivers and a myriad of other occupations⁴⁶ (Figure 2.21).

When work began in earnest in the middle and late 1920s, the Australian economy was beginning to slow, heading towards a worldwide depression. Despite the dangers of working on the SHB construction, it was one of the largest employment projects undertaken in Sydney, if not Australia, at that time. As the SHB grew and the economy contracted, the project came to be called the 'Iron Lung' because it

Figure 2.21 Carpenters working on sleepers for the train tracks. Most trades in the construction industry were represented amongst the SHB workforce.



(Source: State Records NRS 12685/4/8732)

"Governor's Speech." The Sydney Morning Herald, 21 March 1932, p 11m viewed 9 August 2017, http://nla.gov.au/nla.news-article16849475.
 Roads and Traff ic Authority, op cit, p 17.

46. Lalor, op cit, p 161.

Figure 2.22 Riggers above the void. Working on the SHB was often hazardous, with long drops and no safety harnesses.



(Source: Mitchell Library DG ON4/ 2270)

had kept so many people employed for so long.⁴⁷ As well as the prospect of a job, the project itself inspired the workers involved. Most were aware that they were part of a major engineering feat and one that Sydney was watching grow every day. As the arch began to extend, it quickly surpassed any other built structure in Sydney in size and height. The project was using techniques and methods never before used in construction in Australia. Even as it was being built, it was already inspiring art and poetry that responded to its sculptural form.

Oral histories of the workers recorded 50 years after the official opening of the SHB reveal that the project remained, for many, a major event in their working lives.⁴⁸

Figure 2.23 The finishing touches, laying granite on the pylon towers.



(Source: Mitchell Library PXA 624 v.2)

Figure 2.24 Trams cross the SHB. The SHB was designed to accommodate four railway tracks, two on each side. The eastern tracks were built for trams and removed in 1958.



(Source: Keenan)

Figure 2.25 Trams on the tracks near the southern tram tunnels on their way to and from Wynyard. After 1958 the tramway was converted for vehicular traffic.



(Source: Keenan)

Although the SHB had been nicknamed the 'Iron Lung' by many at the time, as it approached completion, men who were no longer required were laid off. Unfortunately, in 1932, the Depression was at its height and many who had worked on the SHB continually, now found they could get no work at all. However, large numbers of men were still needed after it opened. The SHB continues to employ crews of riggers, maintenance workers, painters and other associated trades.

The dangers of working on the SHB were illustrated most graphically in the numbers

Heritage Group, op cit, p 54.
 ibid, p 46. The oral histories of the workers are referred to in some detail in the 1998 Conservation Management Plan and used extensively in Lalor's work.

killed and injured. In total, 16 men died on the construction of the SHB: 14 on the SHB site and two in the quarries at Moruya. At least one survived a fall from the SHB to the harbour below. Many more were injured, some permanently. Working without safety lines and harnesses, many workers were hit by falling rivets and tools. slipped from platforms, or were injured and maimed by machines and vehicles (Figures 2.22 and 2.23). Since opening, another two workers have died on the SHB.49

2.5 Beyond 1932: The working life of the bridge

2.5.1 Traffic management

Since the opening of the SHB in March 1932, there has been a variety of physical additions and alterations made to the structure; some great, some small, in response to the changing uses and needs of the SHB.

The main working purpose of the SHB is to convey public and private transport across the expanse of Sydney Harbour; and it is in regard to the balance of public and private usage that most change to the SHB has occurred. In 1958 the most dramatic of these alterations was undertaken following the phasing out of trams from Sydney's streets. The SHB had been built to accommodate four rail tracks, two down each side, to carry trains. The tracks on the eastern side were to carry the proposed rail line to Manly and Warringah. Bradfield suggested using them temporarily for trams until such time as they were needed for trains, thereby allowing the extension of the tram service from Milsons Point to the city.⁵⁰ Although opposed by the Railway Commissioner, tram tracks were installed along the eastern side, connecting trams to the underground terminus at Wynyard. On the north side, the tramway approached the SHB over a steel arch bridge that crossed Alfred Street (near Junction and Lavender Streets) and joined the SHB proper close to the current

northeastern pedestrian stairway, which was built to access the Milsons Point tram island platform (Figures 2.24 and 2.25).

The last tram crossed the SHB on the evening of 28 June 1958. After the closure of the tram service, a number of physical changes to the SHB were carried out. Most notably, the tramway was converted into lanes to carry road traffic; the Wynyard tunnels were leased to the Railway Institute for a shooting range and to the Menzies Hotel for a car park. The tunnels are still in use as a car park between Cumberland Street and Wynyard Station. On the northern side, the tram station was removed to make way for the road. By 1959, car usage was over 66,000 vehicles per day.⁵¹ In 1966 the former tramway arch on the northern side was also removed to allow for the connection of the Cahill Expressway and Warringah Expressway.

The creation and connection of the two expressways also created a number of major physical changes to the SHB and its immediate surrounds. On the southern side, the Cahill Expressway had been started by the mid-1950s, and the first section from the SHB across Circular Quay to Conservatorium Place was opened in 1958. The Expressway was extended to Woolloomooloo in 1962.54

In a reminder of the 1920s and 1930s demolitions undertaken to construct the SHB, a large number of residential and commercial properties were demolished on the northern side to make way for the Warringah Expressway approaches. Hundreds of rental properties were once more removed and families relocated away from their former neighbourhoods.53 The new expressway also required the removal of the former tramway arch and the four northernmost bays on Ennis Road (demolished in 1966). The first stage of the Warringah Expressway, from the SHB to Miller Street, Cammeray, was opened by Sir Roden Culter in June 1968. This was

51 Lalor, op cit, p 341.

^{49.} Heritage Group, op cit, p 56.

^{50.} Keenan, D 1987, The North Shore Lines of the Sydney Tramway System, Transit Press, Sydney, p 57.

calor, op cit, p 341.
 Roads and Traffic Authority 1988, The Story of the Sydney Harbour Bridge, RTA, Sydney, p 22.
 Spearritt, P 2000, Sydney's Century: A History, UNSW Press, Sydney, p 152.
extended in 1978 by a further 1.4 kilometres, extending as far as Naremburn.

In 1972, a new southern approach was also opened with the completion of the Western Distributor which gives access to motor traffic to and from Sydney's western and southern suburbs.

In 1992, a new harbour crossing was opened in the form of the Sydney Harbour Tunnel. While the various road extensions and freeways previously built had been to ease traffic onto the SHB, by the 1980s it was clear that the SHB alone was increasingly unable to cope with the load of traffic crossing it. A second crossing, which had been previously suggested, was considered as the most effective means to combat the congestion. Work commenced in January 1988 and the tunnel opened to traffic in August 1992. The tunnel crosses the harbour to the east of the SHB, running in a line from Bradfield Park to east Circular Quay. On the northern side, the tunnel is entered from the Warringah Freeway and exits on the south side to join the Cahill Expressway in the Botanic Gardens.

Actual traffic management on the SHB between 1932 and 1951 consisted of police on point duty at both ends during peak hour. Between 1951 and 1985, lanes were marked out by removable rubber lane markers, placed and removed by hand twice daily for peak hours. From 1977 the system began to be modified with the introduction of movable median strips. In 1986 this was followed up with the erection of new overhead gantries with lane indicator lights and electric lane control signals, phasing out the rubber lane markers.

From the opening in 1932, tolls were charged on vehicles crossing the SHB. This was viewed with some consternation and objections from residents of the North Shore who had been paying an additional land tax

to pay for the SHB since 1923. Toll collectors were initially installed on a traffic island with a small rail around them until December 1932 when toll booths and toll bars were added.⁵⁴ The toll bars were modified in 1959 and again in 1970, when automatic one way toll collection and movable toll cabins were installed, along with new toll offices and staff amenities. Cashless e-tag toll collection was introduced in 2009, and in 2012 plans were made to remove the toll booths from the southern and northern ends of the SHB.⁵⁵ Works to remove the toll booths from the southern end were started in late 2017 and were completed by the first quarter of 2018.⁵⁶ The northern toll plazas, including the associated toll office, were removed in late 2020.

In 1935, the protective barriers (suicide fences) were added to the footways, primarily to discourage suicide attempts. While these were fitted to the water side of each footway, more recently (2005-2006) mesh security fencing with barb wire strands has also been fitted to the roadway side of each footway to prevent pedestrian access to the road deck. As well as these protective barriers. roadway crash barriers were installed in 1958. During the later 1980s (1987), extra security was added at the entrance to the pylon lookout, the maintenance access gates on the arch and the fences at the main bearings. The purpose of these modifications was to restrict unauthorised people from areas of the structure that present a danger, and to reduce the risk and consequent liability for the RTA.57

2.5.2 Tenancies in the bays

On the southern side, between 1936 and 1938, the three arches at 1–5 Cumberland Street were fitted out for Darrell Lea for use as a chocolate factory and store, with the middle arch being used by Century Press for their printing operations. The remaining

54. ibid, p 58

Johd, p. 202.
 Besser, L., 'Tags for the Memories: Technology takes its Toll on Bridge Life', The Sydney Morning Herald, 10 January 2009, viewed 9 August 2017, http://www.smh.com.au/news/national/technology-takes-its-toll-on-bridge-life/2009/01/09/1231004286955.html; Roads and Maritime Services, Sydney Harbour Bridge and Tunnel Tolling Upgrades, viewed 9 August 2017, http://www.rms.nsw.gov.au/projects/sydney-inner/sydney-harbour-bridge/tolling-projects/bridge-tunnel-upgrade/index.html).

Roads and Maritime Services, Southern Toll Plaza Precinct Upgrade, viewed 9 August 2017, http://www.rms.nsw.gov.au/projects/sydney-inner/sydney-in

bays on both sides of the harbour continue to be leased for commercial purposes. As mentioned above, a number of the northern approach bays were demolished in the 1960s to make way for the approaching expressways. Most of the northern approach bays had been utilised since the SHB opening for shops, offices and other uses. In 1932, bays 12-14 and 16-18 on Ennis Road (that is, the three bays either side of the entrance to Milsons Point station) were enclosed and fitted out as shops. These were followed in 1936 by bays 1-4 on Middlemiss Street being enclosed and converted to a motor showroom and repair workshops. Bays 5-10 were enclosed and fitted out by 1941. Between 1949 and 1966. the remaining bays on Ennis Road were all enclosed for various uses including by the Commonwealth Bank, a DMR Laboratory and later a toll office.

Roads and Maritime (now Transport for NSW) relocated its head office to Ennis Road in 2016 after a substantial refurbishment program, fully occupying bays 1 to 11, the first floor of bay 12, and half of the first floor of bay 13.

2.5.3 Illuminating the bridge

The SHB, due to its size and positioning, is a landmark in Sydney and on Sydney Harbour. Even before work on its construction had begun, Bradfield recognised that the SHB could be used as a backdrop for events and specially lit to celebrate them. He had suggested the silhouette of the SHB could be used to represent the badge of the Australian Military Forces to commemorate the First World War as early as 1922.⁵⁸

A feature of the SHB since its official opening has been its external lighting, used in both a functional and ceremonial way, which has contributed to its retention of landmark status in an increasingly illuminated night sky (Figure 2.26). The SHB was originally lit by 292 two-post and two-bracket type fittings with the road lighting provided via overhead brackets on Figure 2.26 The SHB illuminated for the 1937 coronation of King George VI. Lighting the SHB has played an important part in its role in celebrations.



(Source: Mitchell Library NCY 37/127)

Figure 2.27 Crowds on the observation deck soon after opening. The SHB was the tallest structure in Sydney until the 1960s and provided a view of the city rarely seen by its citizens of that time.



(Source: Mitchell Library DG ON4/4033)

Figure 2.28 Observation deck in 1961. With a museum and views, the observation deck remains a popular tourist destination.



(Source: National Archives of Australia A1500/K6512)

58. Prunster, U 1982, The Sydney Harbour Bridge 1932–1982, Angus and Robertson, Sydney, p 17.

the arch section and smaller post fittings on the approaches.⁵⁹ Four large post fittings marked the north and south of the SHB, with eight large bracket fittings attached to the retaining walls on the northern side, two each side of the Lavender Street railway arch and the tramway arch. The light fittings were all of an Art Deco inspired lantern design, designed by the NSW Public Works Department.

The lights were installed by the NSW Government Railways, powered from the Ultimo and White Bay Power Stations through substations at Argyle Street and in the north and south pylons.

In 1955, diffusers were added to the roadway lighting to direct light down on the roadway. Following the conversion of the tramway to a roadway, modern light standards and fittings were installed along the eastern side and then gradually fitted throughout the entire SHB and approaches. The traditional post type lanterns were left on the four sets of SHB stairs, as well as the wall bracket at Lavender Street. In 2016, RMS started reinstating replicas of the 1932 roadway light fittings on the SHB. The replicas were cast from the original fittings but modified for an LED bulb.⁶⁰

Night-time floodlighting is now a prominent feature of the SHB. The floodlighting was added as a permanent fixture on the eastern side in 1962, and on the western side by 1984. Prior to this, floodlighting had been a temporary measure, with illumination on the opening night provided by the searchlights of the surrounding ships.⁶¹ The floodlights were updated in 1988 and 1992, although both times their effects were negated by the brightness of the roadway.

Marine and air navigation lights were also installed on the SHB in 1931 and 1949 respectively.

2.5.4 Using the pylons and pylon towers

Some changes and alterations have also been undertaken within the pylons. Until 1990, the northern pylon was used for storage and as garage space. In 1990, part of the northern pylon was converted to accommodate the exhaust from the Harbour Tunnel. The exhaust utilises the space in the northeast pylon tower. The remaining space in the pylon continues to be used as storage and garage space, as well as by maintenance crews. The southern pylon is used by SHB crews, maintenance and the rigging department, for workshops and offices.

While both pylons include large internal spaces, only the southeast pylon was ever made available for public access. The southwest pylon tower included a post office at the opening ceremony so people attending could send an official commemorative postcard or telegram. On the upper levels was a museum consisting of plans, models, photographs, documents and memorabilia which was open to the public on weekends and public holidays. From 1933, the southeast pylon tower's upper levels were leased to Archer Whitford who opened a funfair, which included animal exhibits such as a rooster with an 18-foot tail, funny mirrors and penny peep shows.⁶² Whitford's funfair lasted for nine years until 1941-1942, when the southeast pylon was closed to the public, occupied by the military and anti-aircraft guns mounted to protect Sydney against air attack.

After the war, the southeast pylon tower, which included a lookout/observation deck, was leased to Mrs Yvonne Rentoul, who opened a shop (with a post office from 1953) inside the top of the pylon. Mrs Rentoul was also a cat lover and at one stage had up to 60 cats within her pylon shop, selling kittens as well as souvenirs.⁶³ The shop and lookout were accessed via an elevator

63. ibid. p 347.

^{59.} Heritage Group, op cit, p 60.

^{60.} Lambrechtsen, T, The Sydney Harbour Bridge Going LED, 10 May 2016, viewed 9 August 2017, https://www.linkedin.com/pulse/sydney-harbour-bridge-going-led-tony-lambrechtsen.

^{61.} ibid, p 61. 62. Lalor, op cit, p 346

entered from the ground level within the southern pylon. In 1971, Mrs Rentoul's lease expired and the lookout was closed. It was reopened in 1982 by the RTA as a museum of the SHB, accessed through the pylon via the pedestrian footway. The Pylon Lookout™ and museum is still open to the public, and contains the contents of the original museum, relocated from the southwest pylon tower (Figures 2.27 and 2.28).

2.5.5 Walking/cycling the bridge

The SHB was originally opened with pedestrian walkways on both the eastern and western sides. In 1972 the western footway was converted to a cycleway, with ramps installed on the north and south side for access. In July 2016, the NSW Government announced plans to install lifts at the northern and southern ends of the eastern footway of the SHB to increase accessibility. Investigations to confirm the geotechnical conditions and location of existing utilities were undertaken at Cumberland Street, The Rocks, (south end) and Broughton Street, Kirribilli, (north end) by RMS in February 2017, as was an assessment of the potential visual impacts of the lifts on the heritage significance of the SHB.⁶⁴ Work to build the lifts commenced in April 2018.65

Crossing the SHB on foot, or by bicycle, has never been subject to a charge, although a small fee was levied to access the southeast pylon tower. Since October 1998, the SHB Concessionaire has been taking paying tourists on tethered tours to the top of the SHB's upper arch. Starting from inside the northernmost bays in Cumberland Street. the tours access the SHB via a catwalk beneath the road approaches, then through the upper level on the eastern side of the southern pylon, up a ladder on the end post of the arch to the stairs on the top chord. Climbing up the eastern side for a photo

at the top near the flag poles, the climb groups cross a lateral girder to the western side and descend on the western side of the southern pylon tower, back to ground level.

The introduction of guided climbs necessitated a number of physical changes to the SHB for both safety and access. An opening was created in the southern pylon, directly beneath the roadway on the eastern side to allow walkers to access the approach span, while a steel cable, with associated braces and brackets, has been added to the top side of the steel arch to allow climbers to be securely tethered at all times.

Within four years of starting, over one million people had paid to climb to the top of the SHB. This figure has climbed much higher since 2003 with an average of 1000 climbers on the SHB per day.66

Before the SHB Concessionaire commenced guided climbs, however, a long line of climbers had scaled the SHB, many as guests or employees of the Department of Main Roads, others scaling it unofficially, often at night and on the weekends. Illegally climbing the SHB was an urban mountaineering style adventure that had been ongoing from soon after it was opened up until the heightened security consciousness of the late 1990s and the tightened commercialisation of access after the establishment of the SHB Concessionaire's guided climbs.⁶⁷

As well as attracting climbers to its lofty heights, the SHB has attracted pedestrians to walk across its roadways on the rare occasions that it has been closed to vehicular traffic. On 16 March 1932, the day of opening, the roadway was restricted to pedestrians, with estimates ranging between 300,000 and one million people walking across the SHB (Figure 2.29). Three days prior to the opening day, school children from across New South Wales had been

^{64.} Blumer, C and Rapier A, 'Sydney Harbour Bridge accessibility plan shelved due to "lack of funding", ABC News, 25 July 2017, viewed 9 August 2017, ment/8739250>: Rr Starter, C and Kapler A, Joshey T, Joshey J, Joshey J, Starter A, Starter A, Starter A, Starter A, Joshey J, Joshe cts/access-lifts.html>

^{65.} Roads and Maritime Services, Sydney Harbour Bridge access lifts, viewed 17 January 2018, < http://www.rms.nsw.gov.au/projects/sydney-inner/ sydney-harbour-bridge/access-projects/access-lifts.html>
66. <www.BridgeClimb.com>.
67. Lalor, op cit, p 344.



Figure 2.29 Certificate to commemorate walking the SHB on opening day.

(Source: National Library of Australia PIC P1060)

invited to walk over the SHB on Children's Day. It was estimated that 100,000 crossed on that day, despite the rain.⁶⁸ The next time the SHB was opened for pedestrians was in June 1946 to celebrate Victory Day when 20,000 marched across. Then it was not until 1982, at the 50th anniversary celebrations, and then again in 1992, at the 60th anniversary celebrations, that the roadway was made available to pedestrians. As in the past, the opportunity to walk across the roadway of the SHB attracted enormous crowds, with over 500,000 in 1982 and over 300,000 in 1992. In May 2000, the SHB was again opened for pedestrians when over 200,000 protesters participated in a reconciliation march.⁶⁹ This was the first time the SHB had been the focus for a political demonstration of such magnitude, rather than for a commemoration or celebration. It is a mark of the SHB's position

in the psyche of the people of Sydney that each time the opportunity has arisen to walk on its road surface, pedestrians have flocked to it.

Since 2000, the SHB has also been used annually for the Sydney Marathon, first run during the 2000 Sydney Olympic Games, and a smaller SHB event, both held on the same day.

On 18 March 2007, the SHB was again closed to vehicular traffic to allow thousands of pedestrians to cross the harbour over the roadway from north to south to celebrate the 75th anniversary of its opening in 1932.

'Breakfast on the Bridge' was established in 2009 as the marquee event for Crave Sydney, a month-long festival showcasing Sydney's entertainment, food and art (Figure 2.30). On 25 October 2009 turf was laid across the eight lanes of bitumen and 6000

68. ibid, p 329. 69. ibid, p 353. people celebrated a picnic accompanied by live music. The event was repeated in 2010 but was relocated to Bondi Beach in 2011 due to traffic concerns about the prolonged closing of the SHB.

In 2012, a 1930s themed picnic party was held at Bradfield Park to mark the 80th anniversary of its opening on 19 March 1932.

2.5.6 A symbol of Sydney

Figure 2.30 Breakfast on the Bridge 2009.



(Source: Sydney Morning Herald, October 25, 2009)

Figure 2.31 Temporary Olympic rings during the Sydney 2000 Olympics. The framework of the SHB and silhouette are the perfect backdrop for such illuminations.



(Source: National Library of Australia PIC NL 38730-7)

Since its opening day, the SHB has been a focus for celebrations. The first of many fireworks displays was held on the night of the opening day. Since then, fireworks have been increasingly used on the SHB as a focal point (for special occasions such as New Year's Eve), either with the SHB as backdrop or as the centre of the display. This has been especially the case since the 1988 Bicentenary. On this occasion, the fireworks were launched from the arch and the deck level of the SHB. The spectacle has been reworked each year since, growing ever larger. For the turn of the millennium, the SHB provided the background for another piece of 1930s Sydney iconography. The word Eternity, made famous by eccentric Sydneysider, Arthur Stace, who had secretly scrawled the word across Sydney footpaths from the 1930s until the 1960s, was written large on the eastern face of the SHB. This opened the year 2000 for Sydney, which was the Olympic year, and later the SHB was again festooned with fireworks in the form of the Olympic rings (Figure 2.31).

The 9pm Family and Midnight Fireworks Display has become a de-facto symbol of New Year in Sydney and is an internationally recognised symbol of Sydney and the New Year.⁷⁰ Since the millennium in 1999, the 9pm Family and Midnight Fireworks Display has been themed. The annual creative theme has provided the thread which links the presentation of the two firework displays and a motif on the eastern face of the southern pylon for each New Year's Eve. This motif, or Bridge Effect, has been created via a rope light design, secured to steel panels and fixed to the SHB between the hangers on a specially erected truss. The previous years' themes are shown in Table 2.1 and Figures 2.32-2.49.

70. The Bangkok Post edition of 1 January 2000 had a photo of the bridge and its fireworks as its only front page photo for that edition.

Year	Theme	Year	Theme
1999/2000	Millennium	2010/2011	Make Your Mark
2000/2001	Centenary of Federation	2011/2012	Time to Dream
2001/2002	Year of the Outback	2012/2013	Embrace
2002/2003	Celebration in Unity	2013/2014	Shine
2003/2004	City of Light	2014/2015	Inspire
2004/2005	Reflections on Australiana	2015/2016	City of Colour
2005/2006	Heart of the Harbour	2016/2017	Welcome to SydNYE
2006/2007	A Diamond Night in Emerald City	2017/2018	Wonder
2007/2008	The Time of Our Lives	2018/2019	Pulse of Sydney
2008/2009	Creation	2019/2020	Unity
2009/2010	Awaken the Spirit		

Table 2.1: Sydney New Years Themes from 1999 to 2019.

Figure 2.32 Millennium - 1999.



(Source: City of Sydney)

Figure 2.33 Centenary of Federation - 2000.



(Source: City of Sydney)

Figure 2.34 Year of the Outback - 2001.



(Source: City of Sydney)

Figure 2.35 Celebration in Unity - 2002.



(Source: City of Sydney)

Figure 2.36 City of Lights - 2003.



(Source: City of Sydney)

Figure 2.37 Reflections - 2004.



(Source: City of Sydney)

Figure 2.38 Heart of the Harbour - 2005.



(Source: City of Sydney)

Figure 2.39 A Diamond Night in Emerald City - 2006.



(Source: City of Sydney)

Figure 2.40 The Time of Our Lives - 2007.



(Source: City of Sydney)

Figure 2.41 Creation - 2008.



(Source: City of Sydney)

Figure 2.42 Awaken the Spirit - 2009.



(Source: City of Sydney)

Figure 2.43 Make Your Mark - 2010.



(Source: City of Sydney)

Figure 2.44 Time to Dream - 2011.



(Source: City of Sydney)

Figure 2.45 Embrace - 2012



(Source: City of Sydney)

Figure 2.46 Shine - 2013.



(Source: Reuters)

Figure 2.47 Inspire - 2014.



(Source: City of Sydney)

Figure 2.48 City of Colour - 2015.



(Source: Getty Images)

In December 2010, Oprah Winfrey brought 300 fans to Australia to record her television show. Her time in Sydney culminated in the lighting of a red 'O' on the SHB. Each year since 2013, the SHB has been lit up as part of the Sydney Vivid event. In 2017, as part of Vivid, it was possible for small groups of people to climb to the top of the bridge to an illuminated dance floor.⁷¹

The 9pm Family and Midnight Fireworks Display and the Bridge Effect are seen around the world on New Year's Day and have become powerful symbols of and for Sydney. Prior to the building of the SHB, tourism posters for Sydney and Australia often focused on the beaches or the natural wonders, native animals or Aboriginal curios and culture to attract tourists. However, the SHB offered an engineering masterpiece to rival almost any other in the world to date, and is extensively used as an iconic symbol of Sydney. It also spoke to Australians of their ability to match the creative and industrial endeavours of the world (Figure 2.50).

The construction of the SHB inspired artists, photographers, writers, commentators and poets. The sheer size of the project dwarfed anything else Sydney had seen to that date in both numbers of people involved and physical dimensions. As it Figure 2.49 Welcome to SydNYE - 2016.



(Source: Reuters)

Figure 2.50 Poster for the sesquicentenary of European settlement. The SHB aches over the past, representing the progress of the nation.



(Source: National Library of Australia PIC Poster Z156)

 Russo, R. 'An Illuminated Dancefloor is Popping Up on Top of the Harbour Bridge', TimeOut Sydney, 4 April 2017, viewed 9 August 2017, https://www.timeout.com/sydney/blog/an-illuminated-dancefloor-is-popping-up-on-top-of-the-harbour-bridge-040417. was built, the structure became visible from a multitude of vantage points, and as the tallest structure in Sydney (by far), it could be seen above the rooftops of Sydney's suburban skirt for miles around (including suburbs such as Redfern, Pymble, Hunters Hill and Watsons Bay). Photographs taken of the work by Herni Mallard, Harold Cazneaux and the Department of Public Works in particular captured the iconic nature of the project, the technical achievement, as well as the evocative artistic quality of the SHB. Hundreds of paintings, photographic studies and other visual representations have been created since its opening (Figure 2.51).

As an additional bonus, the symmetry of the design made the structure perfect for kitsch tourist marketing and souvenirs. All manner of items were and have since been manufactured, from tea towels to snow domes, pencil sharpeners to ashtrays, crochet patterns to jewellery.

The following table (Table 2.2) summarises some of the key historical events associated with the SHB. Figure 2.51 Capturing the moment. The building of the SHB was officially recorded by the Public Works Department and the RTA.



(Source: Mitchell Library GPO3-01264)

Date	Event
Pre-1788	At least 1500 Aboriginal people of the Gadigal and Cameragal clans live around the coast and harbour.
1788	The First Fleet arrives.
	Timber observatory built at Dawes Point.
1789	Work commences on a replacement observatory made of stone. Powder magazines are constructed nearby.
1790	Signal station built at Dawes Point and a small battery is established on-site with five cannons taken from HMS Sirius.
1791-1799	Marines from First Fleet return to England and the battery falls into disuse.
1799-1817	Work to upgrade Dawes Point Battery undertaken by successive governors.
1815	Colonial Architect, Francis Greenway suggests to Governor Macquarie the idea of building a bridge across Sydney Harbour.
1816	Emancipated convict, Billy Blue operates the first ferry service between Dawes Point and Millers Point.
1819	Governor Macquarie assigns Francis Greenway to upgrade Dawes Point.
1820-1870	Dawes Point Battery largely rebuilt with expansions to fit new guns, barracks guard houses and a lower battery downslope of the main fort.

Table 2.2: Historical timeline for the Sydney Harbour Bridge and surrounding precincts.

Date	Event
1840s	Coal-powered steam punts operate between Dawes Point and Millers Point.
1857	Engineer, Peter Henderson draws up the first known plan for a cast-iron bridge between Dawes Point and Milsons Point.
1878	Commissioner WC Bennet proposes a floating bridge crossing
1879	TS Parrot proposes a high level bridge crossing.
1880s	Dawes Point Battery is generally used for administration at this time rather than defence.
1881	The Government accepts a bridge plan by JE Garbett for a harbour crossing, but this not implemented. Plans for suspension bridge and a tunnel are also proposed around this time.
1890	A Royal Commission is held to investigate eight schemes (including a tunnel) for crossing the harbour
1900	Minister for Works, EW O'Sullivan calls for a design competition for a harbour crossing.
1909-1924	Officers Quarters at the Barracks are used to house the Water Police and a Trades School for returned WWI service people between 1918 and 1924.
1911	JJC Bradfield, Principal Design Engineer of NSW Public Works Department submits three designs for a bridge crossing. These designs are for a cantilever, a suspension and a combination cantilever arch bridge.
1917	Hell Gate Bridge opens in New York.
1920s	Land resumption on the north and south side of the harbour in preparation of construction of SHB, including demolition of houses in North Sydney/Milsons Point and The Rocks
1925	Demolition of Dawes Point Battery.
1922	The Enabling Act (NSW) is passed allowing for the construction of a crossing from Dawes Point to Milsons Point.
	Bradfield sees the newly built Hell Gate Bridge, New York which rekindles an idea for an arch bridge design.
1923	Tenders are called for a bridge crossing and 20 designs are received from six companies.
	The first sod of the construction of the SHB is turned on 28 July 1923.
	Construction on the bridge approaches begins at North Sydney with the excavation of train tunnels. Properties in North Sydney and The Rocks begin to be demolished.
1924	An arch design by English firm Dorman Long is recommended by Bradfield and is accepted by the government in March.
	Dorman Long use former Trades School buildings and Offices Quarters' as their offices during construction of the SHB.
	The granite processing plant is established at Moruya.
1925	Dorman Long begins excavations at Dawes Point.
	The foundation stone for the southern pylon is laid on 26 March.
	First shipment of steel arrives from England for the construction of the bridge.
1928	Work commences on Wynyard Station as part of the southern approach.
	Erection of arch begins on 16 October.
1929	Construction commences on the Argyle Street Substation.

Date	Event
1930	The two half arches join for the first time on 19 August.
1931	The creeper cranes are dismantled in June and work continues on the pylons and deck surfacing.
1932	The last stone is set on the northern pylon on 15 January and the last rivet is driven in on 21 January.
	The SHB is load tested in February using 72 locomotives.
	The SHB is officially opened on 19 March by Premier Jack Lang, following Captain Francis de Groot's unauthorised cutting of the ribbon moments before. This was followed by a formal parade across SHB. Tens of thousands of people later walked across the SHB and it was opened to traffic at midnight.
	Toll booths and toll bars are added in December. Previously, toll collectors were on traffic islands with a protective rail.
	Bays 12-14 and 16-18 on Ennis Road are enclosed and fitted out for shops. These are the three bays either side of the entrance to Milsons Point station.
1933	Fun Fair opens in the south-east pylon tower and operates until 1941-42.
1935	Safety barriers added to the exterior railings of the footways.
1936	The three arches at 1-5 Cumberland Street fitted out for a Darrell Lea factory and the middle arch for Century Press Printing.
	Bays 1-4 of Middlemiss Street enclosed and used for motor showroom and repair workshop.
1941	Bays 5-10 of Middlemiss Street enclosed and fitted out.
1942	Anti-aircraft guns mounted on southern pylon.
1945	Anti-aircraft guns removed. Shop and lookout opened by Mrs Y Rentoul in the south- east pylon tower. This closed in 1971.
1946	20,000 people march across SHB in June to celebrate Victory Day.
1949	The remaining bays on Ennis Road were fitted out between 1949 and 1966.
1958	The last tram crosses the SHB on 28 June. The tram line is removed and the lanes are used by vehicular traffic. The tram station at Milsons Point is removed.
	The former tram tunnels heading to Wynyard are converted into a firing range and car park.
	The first section of the Cahill Expressway is opened from the SHB across Circular Quay to Conservatorium Place.
1959	Toll bars modified.
1962	Permanent floodlighting added to the eastern side of the bridge; floodlights were added to the western side in 1964.
1966	Former tramway arch east of the Lavender Street arch is removed to allow for the Cahill Expressway and the Warringah Expressway. Four of the northernmost bays on Ennis Road are demolished.
1968	First stage of Warringah Expressway from SHB to Miller Street, Cammeray opens in June. This was extended to Naremburn in 1978.
1970	One way automatic tolling introduced with movable toll booths and new toll offices.

Date	Event
1972	New southern approach to the SHB opened with the completion of the Western Distributor.
	The western footway is converted into a cycleway with ramps at south and north stair entrances.
1977	Introduction of movable median strips on roadway to allow for tidal flow.
1982	Roadway made available to pedestrians as part of the 50 th anniversary celebrations.
	South-east pylon tower re-opened to the public along with SHB museum.
1986	Movable median strips replaced with overhead gantries with lane indicators.
1988	Work commences on the Sydney Harbour Tunnel.
	SHB formed part of fireworks spectacular for the Bicentennial.
1990	Part of the northern pylon used for Sydney Harbour Tunnel exhaust.
1992	Sydney Harbour Tunnel opens to traffic.
	Roadway made available to pedestrians as part of the 60 th anniversary celebrations.
1995	Dawes Point Park excavated in archaeological dig by Sydney Cove Authority revealing gun foundations, powder magazine and other features. Subsequent excavations carried out in 1999 and 2000.
1998	OTTO Holdings (Aust) Pty Ltd (trading as "BridgeClimb Sydney") commences public access tours of the SHB.
1999	The first themed New Years' Eve fireworks display, 'Millennium' occurs on the SHB. A different theme is used for all subsequent New Year's Eve events.
2000	Two hundred thousand people participate in the Walk for Reconciliation march across the SHB. This is the first political demonstration of this magnitude on the SHB.
	SHB incorporated into the route of the Sydney Marathon, first run during the 2000 Sydney Olympic Games.
2005	Safety fencing added to the interior railings of the footway and cycleway.
2007	Roadway made available to pedestrians as part of the 75 th anniversary celebrations.
2009	SHB toll collection goes cashless on 11 January.
	Breakfast on the Bridge held in 2009 and 2010, in which turf was laid on the roadway.
2012	1930's themed party held at Bradfield Park to celebrate the 80 th anniversary of the SHB.
2016	Installation of replicas of original light fittings along the southern side of SHB.
	Roads and Maritime head office is relocated to the bays within the northern approach along Ennis Road, Kirribilli.
2017	Works underway for the removal of toll booths at the southern end of the SHB.
2018	Southern toll plaza precinct upgrade completed in the first quarter of 2018.
2018	Passenger lifts commenced operation on 17 October at Cumberland Street, The Rocks and Broughton Street, Kirribilli, providing access to the eastern walkway.
2018	On 1 October, new SHB Concessionaire Agreement commences with Feliz Puente Pty Ltd trading as BridgeClimb.
2019	On 1 July, Roads and Maritime Services transitioned into Transport for NSW.
2020	The last remaining toll booths (ie the northern toll booths) are removed in late 2020.

2.6 Summary

The SHB is recognised nationally and internationally as a symbol of Sydney. Its position spanning the harbour, its scale and its visual proximity to the World Heritage listed Sydney Opera House, afford it landmark status and pride of place in the public perception of Sydney. During its construction phase, it was thought the construction of the SHB would breathe life into the economies of Sydney and New South Wales, as the Depression took hold. Until the SHB was completed, Sydney had been divided physically by the harbour. Although the two sides were relatively close, for almost 150 years of European settlement the only way across the harbour was via boat or ferry, or the long way around. For some, the SHB project was seen symbolically as linking a divided city. The 'Australian

Worker' commented on its opening that: 'The Bridge unites what once was divided, it stands for oneness, unity, completion'.⁷² The Sydney Morning Herald remarked that: 'Its vast sweeping curves from wherever one may view it, gives a sense of rhythm and harmony, of strength combined with lightness and grace. In short, it is one of the finest and most elegant products of the Age of Steel'.73

The SHB has continued to be recognised for its excellence in engineering and design. It remains isolated in view with little development around it to hide its curving approaches and nothing to obscure its dominant arch. It has been recognised internationally as a significant engineering site, including being designated as an International Engineering Landmark by the American Society of Engineers.⁷⁴

Prunster, op cit, p 16.
 Sydney Morning Herald (Supplement), 20 March 1932.

73. Sydney Morning He
 74. Fraser, op cit, p 112.

3. Sydney Harbour Bridge in context

Physical description 3.1

3.1.1 Introduction

The SHB spans Sydney Harbour, connecting Sydney's northern and southern shores at Milsons Point and Dawes Point. The bridge itself comprises the arch, two granite-faced pylons, approach spans, two railway lines, a cycleway, footpaths and roads between the northern and southern approaches.

The following description of the SHB considers the setting and views to and from the SHB within Sydney Harbour, the fabric of the SHB and other associated elements including the surrounding parklands, subsurface remains and the movable heritage collections associated with the SHB, its construction and its continuing operation.

3.1.2 Setting

The full area of Sydney Harbour extends over 5500 hectares and is one of the world's most famous harbours. The SHB dominates most of the views within the Sydney Harbour and is visible from many places along both sides of Port Jackson, including The Rocks, Circular Quay and Bennelong Point on the southern side; and Kirribilli, Taronga Zoo and McMahons Point on the northern side (Figures 3.1 to 3.4).

Figure 3.1 View of SHB from Bradfield Park.



(Source: GML 2013)

The SHB itself offers some of the best views of the city of Sydney, the harbour and other iconic elements, including the SOH and Luna Park

The importance of the SHB and its setting as an icon of Sydney and Australia is discussed in Section 3.3.

Refer to Chapter 5 - 'Curtilage assessment' for guidance on how to identify and manage impacts on key views to and from the SHB.

3.1.3 Individual elements¹

The items identified in this section are further described in Volume 2: The Sydney Harbour Bridge Conservation Management Plan: Inventory Records. The Inventory Records were prepared by the Heritage Group, Department of Public Works and Services for NSW Roads and Traffic Authority in August 1997, were updated by Artefact Pty Ltd for Roads and Maritime in 2015, and updated again by GML Heritage Pty Ltd as part of this latest revision to the CMP.

The fabric belonging to SHB includes not only the steel arch and Bradfield Highway surface extending 2.2 kilometres across the harbour. but also:

long expanses of rendered retaining walls, enormous granite-faced pylons, interior spaces in the pylons, occupied tenancies under the approaches and a scattered assortment of items designed for the bridge such as commemorative plaques, light fittings and railings.²

The SHB is constructed of silicon steel trusses and joists painted dark grey. 'The whole structure, while appearing to be curved, is made up of riveted straight steel angles and plates'.³ The deck is hung from the main arch-truss by 40 silicon steel hangars, which are connected to latticed

The items identified in Section 3.2.3 Individual Elements are listed in the Sydney Harbour Bridge Conservation Management Plan–Inventory Records, prepared by the Heritage Group, Department of Public Works and Services, for NSW Roads and Traffic Authority in August 1997. Full inventory records for most of the items can be found in that report.

Heritage Group, Department of Public Works and Services, Sydney Harbour Bridge Conservation Management Plan–Inventory Records, prepared for NSW Roads and Traffic Authority, August 1997, p 3. ibid, Inventory Record 3.1, p 3.

3

cross girders beneath the railway and road surface.⁴ The main dimensions of the SHB are listed in Table 3.1.





(Source: NSW Department of Planning and Environment)



Figure 3.3 View from SHB looking east.

(Source: GML 2013)

Figure 3.4 View of SHB looking west.



(Source: NSW Department of Planning and Environment)

The roadway surface of the Bradfield Highway consists of steel troughing plates supported over carbon steel stringers, floor beams and cross girders covered with coke concrete and rock asphalt. When tram travel across the SHB ceased, and the tramway rails and associated sleepers and elements were removed; the tramway was converted to an additional two roadways with an asbestos fibre cement formwork and a reinforced concrete slab, creating the two easternmost (southbound) lanes, later named the Cahill Expressway.⁵

The southern and northern approaches are characterised by large reinforced concrete retaining walls that link the distributor roads on both the north and south shores onto the Bradfield Highway. The northern and southern approach spans comprise open work steel trusses which are mounted on concrete piers and the northern and southern pylons are supported by granitefaced pillars.

The pylons are divided into three large compartments by thick internal walls. The large central and side interior spaces of the southern pylon are utilised by SHB maintenance and security as workshops, amenities and office space. The northern pylon space is partially used for storage and workshop space by the crews that monitor and tow broken down vehicles on the SHB.

The southeast pylon tower is currently operating as a SHB museum and lookout, managed by the SHB Concessionaire, and is the only publicly accessible pylon. Many of the items displayed in the museum form part of the SHB Movable Heritage Collection, which is discussed in Section 3.2.6 below.

Throughout the construction of the SHB, many opportunities to publicise and promote progress were taken, with numerous ceremonies and installations of foundation stones, plaques and tree plantings.⁶ Two foundation stones are located on the southern pylon, and were laid in 1925.⁷ Thirteen bronze plaques have also been installed along the SHB and the approaches, commemorating a variety of events including the discovery of Australia,

^{4.} ibid, Inventory Record 3.1, p 3.

ibid, Inventory Record 0.3, pp 1–3.
 ibid, Inventory Record 0.5, p 1.

^{7.} ibid.

the foundation of the Commonwealth of Australia, Australia's participation in World War I, and the construction of the SHB itself.⁸ Other plagues were proposed and never installed or have been lost over time.

Other smaller elements located on and around the SHB include:

- A variety of bridge lighting fittings and lamps
- Fencing between the motor lanes, train tracks, cycleway and pedestrian access
- Gantries associated with lane changes
- Stairs, ladders and catwalks (public and secured access)
- Maintenance cranes and gantries (used in construction, maintenance and ongoing painting works).

3.1.4 Location and public access

Vehicular access to the SHB (the Bradfield Highway) is via Clarence Street, Kent Street, the Cahill Expressway and the Western Distributor on the southern side; and Arthur Street North, High Street and the Warringah Freeway on the northern side. The SHB has eight vehicular lanes in total, numbered one through eight from west to east; six on its main roadway and lanes seven and eight, formerly two tram tracks, on its eastern side. The SHB has a series of overhead gantries which indicate the direction of flow for each traffic lane. Lanes three, four and five are reversible, while lanes one and two always flow north. Lanes six, seven (a bus lane) and eight, always flow south.

In February 2009, the collection of tolls became fully automated and toll booths and collectors became redundant. The southern toll booths were removed by late 2017 and the associated lanes reformed in the first guarter of 2018. The last remaining northern toll plazas and associated toll office were removed in late 2020. New tolling gantries and equipment were installed in North Sydney in 2017 outside of the SHB

heritage curtilage. These gantries cover all tolling for northbound and southbound traffic across the SHB.

Two train lines are situated on the western side of the SHB. separated from the motor lanes by fencing and concrete barriers. The train lines form part of the North Shore line, between Milsons Point and Wynyard railway stations, on the north and south shores respectively

A 2.5 metre wide cycleway is also located on the western side of the SHB, west of the North line railway tracks. The cycleway is accessed near Milsons Point station in the north, and Observatory Hill Park at Millers Point in the south.

The pedestrian footpath on the eastern side of the SHB can be accessed from the south via Bridge Stairs located near Gloucester Street and Cumberland Street in The Rocks; or the Cahill Walk, along the Cahill Expressway, via Circular Quay or the Botanical Gardens. Pedestrian access from the northern side is available via the Bridge Stairs at Milsons Point.⁹ Roads and Maritime (now Transport for NSW) installed pedestrian lifts at Cumberland Street, The Rocks and Broughton Street, Kirribilli in October 2019 to provide access to the eastern walkway. The southeast pylon lookout is also accessible via the walkway and affords a 360 degree view over Sydney.

Since 1998. customers of the SHB Concessionaire have can now also climb the SHB to gain a similar view, under strict instructions and security arrangements. The SHB Concessionaire's office is located within the SHB approaches in Cumberland Street, and from here climbers walk to the eastern side of the south pylon of the SHB, exit through the pylon and weave through catwalks and up ladders above the harbour and along the eastern arch of the SHB to the summit of the SHB. Climbers return to base descending along the western arch and around the western side of the south pylon.¹⁰

ibid, Inventory Record 0.5 p 2.

Interflory Record 0.5 p.2.
 Heritage Group, Department of Public Works and Services, Sydney Harbour Bridge Conservation Management Plan—Inventory Records, prepared for NSW Roads and Traffic Authority, August 1997, Inventory Record 0.3, p.2.
 Otto Holdings (Aust.) Pty Ltd trading as BridgeClimb, Australia, viewed 9 November 2006 http://www.bridgeclimb.com/Route.htm.

As part of the ongoing operations and maintenance of the SHB, Transport for NSW personnel have extensive vehicular and pedestrian access to the SHB motorways, railway (only under Sydney Trains supervision), pylons and catwalks.

3.1.5 Archaeology

Dawes Point

The history of the Dawes Point Battery site includes the demolition of most of the original structures and buildings during the construction of the SHB, and the later landscaping of the area for a park. In 1995 (and again in 1999 and 2000), archaeological excavations were undertaken to investigate the nature of possible remains associated with the human occupation and military use of the battery site.¹¹

The archaeological excavations undertaken by the then Sydney Cove Authority (former Sydney Harbour Foreshore Authority, now Property NSW), revealed the foundations of a number of the buildings, as well as the gun positions, powder magazine and associated features. These have since been incorporated into a redesign of the park to commemorate the site's association with Australia's colonial history.

Milsons Point

Milsons Point has traditionally been an important crossing point on Sydney Harbour. In 1788, early European settlers to the area reported the occupation of that part of Port Jackson by a Darug clan group known as the Gameragal. Midden campsites, rock engravings and rock shelter art demonstrate elements of the harbour based lifestyle of the Gameragal.

Between the 1850s and 1890s, development at Milsons Point and the township of North Sydney included the establishment of a ferry terminal, cable tram, the extension of the North Shore railway line and the construction of domestic dwellings and shops. During the construction of the SHB in 1923–1932, the ferry and other transport terminals, along with other structures in the vicinity, were demolished and replaced with new train, tram and ferry terminals at MilsonsPoint.

The redevelopment of Bradfield Park included excavation and landscaping to create a sunken garden plaza featuring terraced garden beds leading to an open pedestrian plaza for community use; feature lighting of the SHB pylon and the plaza area with new toilet facilities. The introduction of extensive fill deposits associated with the landscaping of Bradfield Park, and works associated with the installation of the Harbour Tunnel ventilation ducts, would have also modified the landscape of this area so that any fragmentary remains associated with former site development or activities (including evidence associated with the construction of the SHB itself) would be likely located well below the existing ground surface.

On this basis, Bradfield Park is considered to have little or no archaeological potential. This assessment has been confirmed by an archaeological assessment in 2009 of the area beneath the SHB immediately south of Fitzroy Street in Bradfield Park, when the area was being developed as a pedestrian plaza by the then RTA and North Sydney Council.

3.1.6 Movable heritage

The Transport for NSW Movable Heritage Collection (SHI No. 4311604) is listed on Transport for NSW's 170 Heritage and Conservation Register. This listing includes:

- SHB Memorabilia Collection
- SHB Workshops Collection
- Model of Main Bearing and Bridge
- Bronze Bracketed Lanterns

Movable heritage associated with the 'The Rocks (Argyle Street) Railway Substation and Switchhouse' is the responsibility of Railcorp.

11. Johnson, AW 1998, Dawes Point Battery Archaeological Excavations Volume 1, prepared for the Sydney Cove Authority (no page numbers).

The listings for each on the Transport for NSW Section 170 Heritage and Conservation Register are provided in Appendix A. In 2006, the then RTA commissioned International Conservation Services¹² to prepare a Conservation Strategy for the entire RTA owned movable heritage collection associated with the SHB. The 'Sydney Harbour Bridge Movable Heritage Conservation Strategy 2007' provides management policies for the SHB Movable Heritage Collection, which comprises the items listed above.¹³

The collection comprises movable heritage items owned by Transport for NSW and its predecessors, or from the public domain that are associated with the design, construction, official opening and early operations of the SHB. The collection contains a range of items which are significant for their demonstration of aspects of the technical and engineering processes used in the construction of the SHB, including the only known relics of the temporary support structure utilised for the erection of the arch steelwork. It comprises technical instruments and documentation associated with the design and construction stages of the SHB, but also examples of specialised documents and objects used in association with the Opening Day social activities and celebrations, which are evidence of the social customs and attitudes of the time.

The original maintenance cranes, which were removed and replaced in 1997, were assessed as movable heritage items. In 2009, two of the four original cranes underwent conservation works by International Conservation Services in accordance with the Movable Heritage Conservation Strategy. One of these cranes is now on display in the National Museum of Australia. The second crane was temporarily loaned to the museum, and was returned to Roads and Maritime (now Transport for NSW) in 2018.14

Two of the cranes, which were in extremely poor condition, were used as a source of parts for the conservation of the other two. and were then disposed of in 2010.¹⁵ There are also other various movable heritage and record collections associated with the SHB that are displayed and owned by, or lent to, organisations other than Transport for NSW, including Sydney Living Museums, the Powerhouse Museum, State Archives and Records NSW and the Mitchell Library (the State Library of NSW).

In 2007, the then RTA partnered with the then Historic Houses Trust (now Sydney Living Museums) to develop a major cultural exhibition at the Museum of Sydney to commemorate the 75th anniversary of the opening of the SHB, featuring a number of then RTA owned items from the collection. These items have since been returned to Transport for NSW.

3.2 Contextual analysis

3.2.1 Introduction

Prior to the construction of the SHB. vehicular access to the north shore was undertaken via ferry services as well as a series of smaller bridges located further west along the Parramatta River. With increasing levels of traffic in the Sydney/North Sydney area, a royal commission determined in 1890 that a bridge was required to connect the two areas and relieve congestion. Although tunnels were proposed as an alternative, they did not have the same popular appeal. In the 1880s and 1890s, the Brooklyn Bridge in New York (still one of the most famous bridges in the world today) made a huge impact internationally, including on the developing city of Sydney. Those responsible for planning Sydney's transport system at the time aspired to New York City as a model, and aspirational phrases such as 'the metropolis will become like New York with Mosman and North Sydney as a second

^{12.} Heritage input provided by Godden Mackay Logan

Internage input provided by Godden Mackay Logan. International Conservation Services, Sydney Harbour Bridge Movable Heritage Collection Conservation Strategy, 2007, p 7. Email advice from Daniel Percival (RMS), January 2018. Acton, K., Crompton, R., Sampaga, E., Treadgold, F., West, D., Conserving The Sydney Harbour bridge Arch Maintenance Units, http://www.icssydney. com.au, viewed 6/09/2017.

Brooklyn'¹⁶ were common. It was envisaged that a bridge across the harbour would transform the city, so it is not surprising that the idea was the focus of improvement schemes for Sydney discussed before the First World War.

Any bridge has a dramatic visual impact on its surroundings and at the time of its construction, there were fears that the SHB would overwhelm the harbour. The height limit on city buildings at the time was 46 metres and the dominant city landmarks were the towers of the General Post Office and the Lands Building at 77 and 70 metres respectively. The scale of the bridge was overwhelming in comparison; the pylons were 87 metres high and the crown of the arch was 47 metres higher. By the 1930s, however, there was almost universal approval of the design and agreement that the bridge would have positive effects on the harbour and on the landscape of the foreshores. Scholar Helen Proudfoot described it succinctly when she wrote, 'the city of Sydney suddenly crystallised with the building of the Sydney Harbour Bridge ... enhancing the sense of arrival, pulling the shores together and creating the twin amphitheatres, that are now an integral part of the central city'.¹⁷

The construction of the SHB, however, changed the street pattern on the land at each side of the harbour. Whole residential communities in The Rocks/Millers Point and in Milsons Point/North Sydney were demolished and the approach viaducts created a barrier between the suburbs to the east and west. This impact, however, was largely accepted at the time as an unavoidable part of progress.

The majority of people crossing the SHB in its first decade were travelling on public transport and it was not until 1959, after the tram tracks had been converted to roadway, that motor vehicles became the dominant mode.

3.2.2 Social context

Today, the SHB continues to be the main means of crossing the harbour, carrying vehicular, rail and pedestrian traffic between the Sydney Central Business District (CBD) and North Sydney. Although the scale of buildings in the CBD and North Sydney has increased enormously since the 1930s, development of the harbour foreshores has been of a comparatively low scale. As the city's tallest structure until 1967 (when the 182.5 metres tall Australia Square building was constructed in George Street), the SHB still stands as a dominant feature within this Sydney Harbour context. The dramatic water vista focused on Sydney Cove was accentuated with the formal completion of the SOH at Bennelong Point in 1973, and the combined engineering and natural landforms continue to give the place its memorable impact. Visually, the SHB and the SOH, with the high rise city buildings as a backdrop to Circular Quay, have become an iconic image of both Sydney and Australia.

Coping with growing congestion on the SHB has been a continuing concern of the authority responsible for the SHB. Whilst the SHB encouraged the expansion of the northern residential suburbs, it also brought traffic into the city centre and, in the view of some, stopped the development of North Sydney as an alternative city centre.¹⁸ In hindsight, it has been suggested that Los Angeles might have been a better model for Sydney than New York, and that multiple tunnels would have distributed the traffic more evenly, easing the future centralisation and congestion of the CBD.¹⁹ However, as stated in the 1998 CMP, the road and railway network that Bradfield planned 'have never been completed so the bridge cannot be blamed in isolation for the traffic problems that have occurred since the 1950s.' Consequently, the motor vehicle has had to make up the shortfall in

^{16.} Cazneaux et al 1932, The Second Bridge Book, Ure Smith for Art in Australia, Sydney.

Cazheaux et al 1952, The Second Bridge Book, ore similar for Act m Asstand, sydney.
 Proudfoot, Helen 1988, Sydney Harbour Paradise of Waters, Proudfoot Press, Sydney.
 Heritage Group, Department of Public Works and Services, Sydney Harbour Bridge Conservation Management Plan, prepared for NSW Roads and Traffic Authority, February 1998, p 88.
 Jones, Michael 1988, North Sydney 1788-1988, Allen & Unwin, Sydney, p 197.

the public transport provision. 'Whether one views the bridge as a long awaited link or an environmental disaster, it was the most important event in the development of Sydney's transport system.'20

3.3 Iconic value

3.3.1 Introduction

The SHB has become an icon of both Sydney and Australia, with symbolic significance comparable to the Eiffel Tower in Paris, Mount Rushmore in South Dakota and the Taj Mahal in Agra. Widely recognised as the world's greatest single arch bridge, the SHB has continued to be a focal point for tourism promotion and national pride since its opening.

The SHB was quickly adopted as the symbol of Australia, representative of modernity and the arrival of industrial maturity. Internationally, it was seen as a great achievement at a time of worldwide depression. The maximum use of Australian materials and labour was a requirement of the tender for its construction, and the fame of the SHB was reinforced by constant references in the British press and publishing industry-notwithstanding that it was often portrayed as an accomplishment of British engineering. In the words of Spearritt:

The Bridge proved to Australians that they too could become a great industrial society, as the United Kingdom, western Europe and the United States before them. Built at a time when Australia relied heavily on primary exports, it was evidence of their growing technological prowess.²¹

The SHB has dominated its immediate context prior to and since its opening in 1932. Its visual proximity to the World Heritage listed Sydney Opera House, opened 41 years later in 1973, reinforces its landmark status and pride of place in the public perception of Sydney.

The design and construction of the SHB was regarded as a triumph over the Depression times. Its opening ceremony included a vast display of floats and marching bands, a gun salute, a procession of passenger ships under the SHB; and ended with the public being allowed to walk across the roadway (Figure 3.5). Other celebratory measures included the release of three postage stamps to commemorate the opening of the SHB on 14 March 1932.

3.3.2 Events and celebrations

Today, the SHB is the focus of national and local celebrations such as Sydney's New Year Eve and Australia Day celebrations, when hundreds of thousands of people crowd around the foreshores of the harbour to view the fireworks set off from the arch. Spectacular fireworks were also set off for the Australian Bicentennial celebrations in 1988 and at the end of the closing ceremony of the Sydney 2000 Olympic Games. Throughout the duration of the Olympic Games, the SHB was also adorned with the Olympic rings (included in the Olympic torch's route to the Olympic stadium) and formed part of the men's and women's Olympic marathon events. During the millennium celebrations, the SHB was adorned with the word 'Eternity' as a tribute to the legacy of Arthur Malcolm Stace.22

The SHB has also been closed to vehicles to allow pedestrians full access for a number of significant events including the celebration of Victory Day in 1946, the 50th anniversary of the opening of the SHB in 1982 (Figure 3.6), the 60th anniversary in 1992, the Walk for Reconciliation in 2000 and the 75th anniversary in 2007. In 2009 and 2010, people celebrated 'Breakfast on the Bridge'.

^{20.} Heritage Group, Department of Public Works and Services, Sydney Harbour Bridge Conservation Management Plan, prepared for NSW Roads and Traffic Authority, February 1998, p. 88. Spearritt, Peter 1982, The Sydney Harbour Bridge A Life, Allen & Unwin, Sydney, p. 103. Stace, otherwise known as Mr Eternity, was a homeless man who converted to Christianity and spread his form of gospel by writing the word

^{&#}x27;Eternity' on sidewalks in chalk

3.3.3 Art and culture

The SHB is an iconic symbol in popular culture and the visual arts. Commencing in the 1920s with the early stages of its construction, the SHB in its harbour setting became the emblem of Sydney and an inspiration to artists and photographers (Figure 3.7). The multitude of images of the SHB, its representation on souvenirs and clothing, its appearance in cartoons, paintings, photography and film, are all evidence of its status as an instantly recognised symbol.

The SHB is often seen in the backdrop of wedding and tourist photos, and has been featured in many of the more famous works of Australian artists and photographers such as Grace Cossington Smith, David Moore and Brett Whitely.

3.4 Comparative analysis

3.4.1 Introduction

This section examines the origins of the SHB design, and compares the SHB with other major works of engineering with which it shares key features and characteristics, using the following broad categories:

- The Hell Gate Bridge in New York, on which the design of the SHB was based
- Bridges, particularly arch bridges and those in major cities and harbours across the world
- Australian bridges
- Bridges designed by Bradfield and/or built by Dorman Long and Co.
- Bridges with towers and pylons.

3.4.2 The origins of the design of the SHB

Before and following the Parliamentary Standing Committee on Public Works in 1913, there was ongoing discussion about the design of the SHB. John Job Crew Bradfield, the Chief Engineer for the SHB project, advocated a cantilever bridge and submitted two designs to the committee, one with a curved lower chord and the

Figure 3.5 SHB opening ceremony on 14 March 1932.



(Source: National Library, PIC HC/HB 832)

Figure 3.6 View of SHB 50th Anniversary Celebrations.



(Source: Stanton Library, LH REF PF 1641)

Figure 3.7 The Bridge in Curve (1926) painting by Grace Cossington Smith 1892–1984. Tempera on composition board. 83.6 x 111.8 cm.



(Source: National Gallery of Victoria, Melbourne)

other with a horizontal one. However, the Institute of Architects of NSW and Walter Liberty Vernon (NSW Government Architect from 1880-1911) advised that Bradfield's cantilever design would be an 'eyesore'. Vernon favoured a suspension bridge and the Institute suggested that the cantilever design would be enhanced by the addition of 'tower-like formations in steel' and that 'terminal structures in masonry' be built at the junctions between the bridge and the approaches.

In 1921, contract documents were sent out to prospective tenderers for a bridge of a cantilever design with a horizontal bottom chord. However, during Bradfield's trip to assess the tendering firms in Europe and North America in 1922, he cabled a request that an arch bridge be included in the specifications and that the close of tenders be postponed. Use of an arch type bridge would be more economical in terms of weight of steel and would also allow room for a curved railway on the north side, which would not have been possible with a cantilever or a suspension design. Bradfield's change in position on bridge type may have been triggered by suggestions by tenderers or by his first sight of the completed Hell Gate Bridge in New York. As described in the 1998 CMP:

The arch bridge included in the revised contract documents bears an unmistakable resemblance to Hell Gate Bridge designed by Gustav Lindenthal. The similarity, due partly no doubt to the short time available, is striking in all aspects of the structure: in the neoclassical design of the pylons, in the parabolic shape of the arch with the reverse curve at each end, in the odd number of panels with the middle panel cross-braced. Bradfield even showed the top chord extending past the end of the arch into the pylon just as at Hell Gate. Apart from the fact that the span was increased by 68% and the number of panels from 23 to 33, the design concept is identical to Lindenthal's.²³

By the early 1920s, the railway era was declining and the era of the private motor vehicle was rapidly emerging. The SHB's design reflected the movement away from the heavy railway locomotive to higher volumes of small motor vehicles.

The successful tenderers for the detail design and construction of the SHB were Dorman Long and Co. of Middlesborough in England, who made some aesthetic and practical changes for the SHB, including:

- Having the London firm Sir John Burnet and Partners redesign the pylons in a more contemporary, Art Deco style
- Reducing the number of panels in the arch truss from 33 to 28 and dispensing with the cross-braced central panel
- Lowering the deck level relative to the arch and adjusting the pylons to suit
- Widening the gap between the end posts of the arch and the face of the pylons to over 18 metres at deck level, therefore introducing a visual separation between the arch and the pylons.

In 1929, as a result of a series of articles in the Sydney Morning Herald which described the consulting engineer to Dorman Long and Co., (Sir) Ralph Freeman, as 'the designer' of the SHB, controversy

23 ibid, p 79.

flared over who really designed the SHB.²⁴ Although modifications were made to the SHB design after Freeman's visit in 1926 (see list above), Bradfield wrote in a report on the matter: 'I originated the cantilever bridge design recommended by the public works committee in 1913 and subsequently the arch bridge design of 1650 feet span'; he went on to say that Freeman was not the designer and that tenders were called on his own design.²⁵ In Spearritt's writings on the matter, he describes that in 1932:

... Dorman Long threatened to sue the government if it erected a plaque naming Bradfield as the designer. One informed view was that the 'detail design was entrusted to Lawrence Ennis who became first Honorary Member of the Institution [of Engineers, Australia] in 1932'. Professor Crawford Munro also considered that Bradfield 'did not design the Sydney Harbour Bridge which we now behold'.

The controversy was never finally resolved, but when Bradfield retired in 1933, the director of public works stated that Bradfield was the designer of the bridge and that 'no other person by any stretch of imagination, can claim that distinction.'²⁶

Today, a plaque can be viewed on the SHB naming Bradfield as the designer

3.4.3 Hell Gate Bridge

The design of the SHB was based on the Hell Gate Bridge, New York, designed ten years earlier by Gustav Lindenthal. During the development of the Hell Gate design, Lindenthal considered two arched proposals: crescent-shaped and spandrel-braced versions. While the crescent-shaped arch was expected to use less steel, the spandrelbraced arch was chosen because it looked better and was easier to erect. Lindenthal's two-hinged, spandrel-braced arch was itself based on previous German bridges such as those designed by R Krohn to span the Rhine at Bonn and Düsseldorf. It has been suggested that the general ignorance about the intellectual origins of the SHB is due to the strong Germanic influence on the design, at a time when Germans were seen as enemies.²⁷ While there were economic and practical reasons why an arch form was used in both bridges, a major consideration was that the arch made for 'a more monumental entrance' than other forms.

Figure 3.8 Hell Gate Bridge in New York, USA, constructed in 1917.



(Source: Heritage Group, Department of Public Works and Services, Sydney Harbour Bridge Conservation Management Plan, prepared for NSW Roads and Traffic Authority, February 1998, p 84)

Figure 3.9 New Tyne Bridge in Newcastleupon-Tyne, England, constructed in 1928.



(Source: Heritage Group, Department of Public Works and Services, Sydney Harbour Bridge Conservation Management Plan, prepared for NSW Roads and Traffic Authority, February 1998, p 84)

Although of the same design concept as the Hell Gate Bridge (Figure 3.8), the increase in sheer size of the SHB attests to its significance. The span of SHB is 205 metres greater than the Hell Gate Bridge and

Spearritt, Peter 1979, 'Bradfield, John Job Crew (1867–1943)', Australian Dictionary of Biography, Volume 7, Melbourne University Press, pp 381–383.
 ibid.

27. Ammann, OH 1918, 'The Hell Gate Arch Bridge and Approaches', in Transactions of American Society of Civil Engineers, Vol. 82, p 871.

contains the heaviest steelwork of its kind ever constructed. The 1998 CMP describes the rectangular box sections of the SHB as being of an '... unprecedented size ... using steel plate of the extraordinary thickness of 50 millimetre'. Although a similar thickness and form was adopted as for the Hell Gate Bridge, '... the sections were of a flatter shape and nearly twice as massive'.28

Apart from its greater size and picturesque setting, the main characteristics that distinguish the SHB from the Hell Gate Bridge are the changes made by the successful tenderers, Dorman Long and Co., as discussed in Section 3.4.2

3.4.4 Bridges, particularly arch bridges and those in major cities and harbours across the world

In terms of international recognition, the SHB compares with the Iron Bridge in Shropshire, Tower Bridge in London, the Brooklyn Bridge in New York, the Golden Gate Bridge in San Francisco and the Millau Viaduct in southern France. In Section 3.4.3,

comparisons were made between the SHB and the Hell Gate Bridge. It is also worth noting that the SHB resembles the New Tyne Bridge in Newcastle-upon-Tyne, England (Figure 3.9) and the Bayonne Bridge in New Jersey, USA, constructed in 1928 and 1931 respectively. Whilst the former bridge was also constructed by Dorman Long and Co., using a similar erection technique, both bridges were of a much smaller scale and did not incorporate any pylons.

Recorded in the 2006 Guinness World Records as the widest long-span bridge in the world, the SHB ranks as the third longest steel arch bridge on the planet. It is also considered by some to be 'the world's greatest steel arch' because of its combination of span, width and load-bearing capacity, and for the difficulties overcome in its erection.²⁹ The following table allows for the comparison of SHB in relation to the development of long-span bridges and to other notable examples of bridge design since the eighteenth century.

		-
Dimensions	Hell Gate Bridge	Sydney Harbou

Table 3.1 Comparison of Steelwork between Hell Gate Bridge and SHB.

Dimensions	Hell Gate Bridge	Sydney Harbour Bridge
Maximum chord dimension	2.0 x 3.15m	3.4 x 2.5m
Maximum steel plate thickness	50mm	50mm
Maximum steel angle size	200mm x 200mm x 25mm	300mm x 300mm x 32mm
Maximum gross cross-sectional area of steel in member	0.9m ²	1.7m ²

Table 3.2 Chronology of bridges.

Date	Item
1758	Bridge at Schaffhausen. 129 metre timber arched truss designed by Hans Ulrich Grubenmann. Longest span in the world at the time.
1779	Iron Bridge, Coalbrookdale, England. 31 metre cast iron semi-circular arch by Abraham Darby III. First iron bridge.
1826	Menai Bridge, Wales. 177 metre suspension designed by Thomas Telford. Longest span in the world at the time. Had problems with excessive movement.
1866	Cincinnati Bridge, Ohio River, USA. 322 metre suspension designed by J Roebling. Longest span in the world at the time.

^{28.} Heritage Group, Department of Public Works and Services, Sydney Harbour Bridge Conservation Management Plan, prepared for NSW Roads and Traffic Authority, February 1998, p 81.
 Encyclopedia Britannica, 1992 (Bridges, Construction and History of).

Date	Item
1874	Eads' Bridge, St Louis, Missouri, USA. First major structure to use steel. Three steel arched trusses: 153, 159 and 153 metres designed by James B Eads. Longest arches in the world at the time.
1878	Tay Bridge Disaster, Scotland. Iron trusses designed by Sir Thomas Bouch. Collapsed due to faulty materials and construction.
1883	Brooklyn Bridge, New York. 486 metre suspension bridge designed by John Roebling. Longest span in the world at the time. Designed for two rail lines, two tram tracks, two road lanes and a footway.
1884	Garabit Viaduct, France. 165 metre wrought iron crescent-shaped arch with hinged supports, designed by Gustave Eiffel. World's longest arch span at the time.
1890	Forth Railway Bridge, Firth of Forth, Scotland. 521 metre steel cantilever trusses (two spans) designed by Sir John Fowler and Sir Benjamin Baker. Used riveted steel tubes 3.6 metre diameter and construction adopted from ship building.
1897	Niagara Clifton Bridge. 256 metre span steel arch, longest arch span of its day.
1898	Bridges over the Rhine, Bonn and Düsseldorf. 181 and 187 metre steel spandrel-braced arches designed by R Krohn. Major influence on the design of the Hell Gate Bridge.
1898	Niagara Falls Bridge. 256 metre span arch bridge, wrecked 40 years later by ice jam in river.
1905	Victoria Falls Bridge. 152 metre braced arch carrying railway across Zambezi river. Designed by Ralph Freeman under GA Hobson and built by Cleveland Bridge Co. The first of Freeman's steel arch bridges.
1917	Quebec Bridge, St Lawrence River, Canada. Span 549 metre cantilever. Collapsed during construction in 1907, rebuilt in 1917. Specification for steelwork used on SHB. ³⁰
1917	Hell Gate Bridge, New York. Span 298 metres. Two-hinged spandrel-braced steel arch with heavy masonry towers designed by Gustav Lindenthal. Erected by holding back half-arches with cables. Suitable for sharp curve on adjoining railway. Granite faced masonry towers justified mainly on visual grounds.
1926	Camden Bridge, Delaware River, Philadelphia, USA. Span 533 metres. Suspension bridge with granite faced anchorage towers and design similarities with SHB. Architect Paul Crét.
1928	New Tyne Bridge, Newcastle-upon-Tyne, England. Span 162 metres. Steel, crescent-shaped arch, designed by Mott, Hay and Anderson. Heaviest arch bridge in Europe.
1931	George Washington Bridge, Hudson River, New York. Span 1067 metre suspension bridge designed by OH Ammann for a 27 metre roadway, two 3 metre walkways, future lower deck to support four rail tracks. Steel towers supposed to be clad in masonry. Cladding was controversial and did not proceed.
1931	Bayonne Bridge, Kill van Kull, New Jersey. Span 503.5 metre two-hinged steel arch designed by OH Ammann for 20 metre roadway and two 2 metre walkways. Roadway suspended from wire ropes. Arch erected on a series of temporary towers placed in the channel. Purely decorative, granite faced pylons planned but not built.
1932	SHB. Span 502.9 metres. Two-hinged steel spandrel arch designed by JJC Bradfield and Ralph Freeman for 17.4 metre roadway, four railway lines and two footpaths. Design shown in tender documents similar to Hell Gate Bridge.
1935	Birchenough Bridge, Sadi River, Southern Rhodesia. Span 329 metre steel arch by Ralph Freeman. Similar design to Hell Gate Bridge.
1937	Golden Gate Bridge, San Francisco. Span 1280 metre suspension bridge. Designed for 18 metre roadway and two walkways.

30. Freeman, Ralph 1933-1934, Sydney Harbour Bridge: Design of the Structure and Foundations, Inst. C.E, London, Vol. 238, Part 2, p 160.

Date	Item
1940	Tacoma Narrows Bridge, Washington. Span 853 metre suspension bridge. The bridge became famous for a dramatic wind-induced structural collapse four months after its opening. A replacement bridge was built later in 1950.
1964	Port Mann Bridge, Vancouver, British Colombia. Span 366 metre steel arch.
1965	Bridge over Niagara River, Queenston to Lewiston. Span 305 metre steel rib arch.
1966	Orlick Reservoir Bridge, Czechoslovakia. Span 380 metre steel arch.
1973	Freemont Bridge, Portland, Oregon. Span 383 metre steel arch.
1977	New River Gorge Bridge, Fayetteville, West Virginia. Span 518.5 metre steel arch.
2004	Millau Viaduct spanning the valley of the River Tarn near Millau in southern France. A cable-stayed bridge and the tallest bridge in the world, with one mast at 343 metres above the base of the structure.

3.4.5 Australian Bridges

Within the Australian context, no other steel bridge compares with the SHB's level of technical and social significance. However, there are other bridges which are significant for their age and other characteristics, such as:

- The Richmond Bridge, Tasmania—built in 1825 by convict labour, it is entered in the National Heritage List as Australia's earliest large stone arch bridge.
- The Story Bridge, Brisbane—also designed by Bradfield, the large steel symmetrical cantilever bridge was completed in 1940. Whilst the bridge is symbolic of Brisbane, it not as well known nationally as the SHB and does not symbolise Australia internationally.
- Gladesville Bridge, Sydney–completed in 1964, the Gladesville Bridge was the longest concrete arch bridge in the world at the time of its completion, and remains the longest concrete arch span bridge in Australia today. It is listed on the NSW State Heritage Register, and is recognised as a world landmark engineering achievement. However, the bridge does not have the same national or international iconic status as the SHB, which can be partly attributed to its location, which is some distance from the centre of the city. In addition, the bridge is not as aesthetically distinctive as the SHB when crossing the bridge,

as the structure is largely located below the deck.

- West Gate Bridge, Melbournecompleted in 1978, with construction delayed by a tragic collapse of a 112 metre section of the span, which fell 50 metres to the water below, killing 35 construction workers, making it Australia's worst industrial accident. The bridge is a steel box girder cable-stayed bridge spanning the Yarra River. The main river span is 336 metres, and the height above the water is 58 metres. The total length of the bridge is 2,582 metres, making it the third longest bridge in Australia, and is twice as long as the SHB. However, it lacks the visual drama and (for its time) technical achievement of the SHB, and has not been recognised as a nationally significance heritage item.
- Anzac Bridge, Sydney—constructed between 1989 and 1995, the Anzac Bridge is significant for its scale, aesthetics and design features. It is a reinforced concrete cable-stayed bridge, the longest such bridge in Australia. The reinforced concrete towers at its ends are visually striking and highly visible. The bridge is a well-known landmark in Sydney, but lacks the wider state, national and international recognition of the SHB.

Figure 3.10 View of SHB Dawes Point pylon.



(Source: Greg O'Beirne, 2006)

3.4.6 Bridges designed by Bradfield and/or built by Dorman Long and Co.

Story Bridge, Brisbane designed by Bradfield.

- The Story Bridge is the only other bridge designed by John Bradfield. Construction began in 1935 and the bridge was opened in 1940, eight years after the SHB. It is believed that Bradfield based his design on the Jacques Cartier Bridge in Montreal. The bridge was constructed by a consortium of two companies, Evans Deakin and Hornibrook Constructions.
- Although the overall form and structure differs from the SHB, the two bridges share a common aesthetic language through the repetitive use of riveted steel trussed elements.
- The Storey Bridge is the longest steel cantilever bridge in Australia, spanning across the Brisbane River and connecting Brisbane's north and south suburbs. The main span is 281.7 metres in length. The bridge accommodates vehicular traffic, bicycles and pedestrians. The bridge is a celebrated landmark of Brisbane and was listed on the Queensland Heritage Register in 1992. Unlike the SHB however it is not listed on the National Heritage List.

Bridges by Dorman Long and Co. (Dorma Long) Dorman Long's work has an international history. In the 1930s alone, Dorman Long constructed bridges in countries including England, Australia, Thailand, Egypt, Zimbabwe and China. Of these, the SHB is the most recognised internationally, but other notable bridges constructed by the company in the 1930s include the following:

- The Tees Newport Bridge is a steel vertical lift bridge spanning the River Tees in the north-east of England. It was constructed by Dorman Long, and opened in 1934 as England's first vertical lift bridge. The arched span of the bridge is designed to be able to be lifted between the twin lifting towers located at the sides of the bridge. The bridge spans 82 metres, and the lifting towers are 55 metres in height.
- The Birchenough Bridge is located in Zimbabwe. It was designed by Ralph Freeman (who was also associated with the design of the SHB), constructed by Dorman Long, and completed in 1935. It is similar in appearance to the SHB, but is two-thirds as long, at 378 metres total length, and does not have distinctive pylon towers at its ends as the SHB does. The bridge is iconic in Zimbabwe and its image appears on the twentycent coin, but it does not have the same international recognition as the SHB.
- The Grafton Bridge is a steel bascule bridge that spans the Clarence River in Grafton in northern NSW. The bridge was constructed by Dorman Long, and was opened in 1932. The bascule span was designed to be raised to allow for river traffic, although this function has now been discontinued. The bridge is supported on seven concrete piers located across the width of the river. The relatively streamlined form of the bridge lacks the distinctive aesthetic qualities of the SHB, and the bridge does not match the SHB in technical achievement. In terms of location, Grafton is a small provincial city that does not compare to Sydney in scale or importance as the capital city of NSW.

All of these bridges utilise a steel structure, and are recognised local or national landmarks. Yet none match the SHB in technical achievement, aesthetic qualities, setting, or international recognition.

3.4.7 Bridges with pylons and towers

The masonry pylons of the SHB, together with the arch itself, contribute to the powerful physical presence of the bridge (Figure 3.10). The visual need for the pylons is not explicitly stated by Bradfield in his Report on Tenders, although he goes to some length to justify the extra cost of granite compared to concrete facing.³¹ Nevertheless, it is surprising that there was not more debate about their inclusion as the 'additional cost of the towers was estimated at £750,000'. In the case of the Hell Gate Bridge, Lindenthal was criticized for 'sullying the structural art of bridge-making with subjective, visual considerations,³² whereas others praised the non-functional towers of Hell Gate. In the paper written by Lindenthal's assistant, OH Ammann, the heavy, granite-faced pylons are justified by saying that they 'give expression to the solidity of the abutments to resist the great thrust of the arch.' As a secondary argument he added that they had a structural function in that they steepened the thrust of the arch.³³ Bradfield uses this same argument later, although the likelihood of any actual slippage in the strata either side of the harbour was remote.

The original architectural style proposed for the pylons was neo-classical. This style, however, was considered to be dated, and as Freeman said in reviewing the tender documents for the bridge, he noted that it was 'capable of improvement architecturally'. On his advice, Sir John Burnet and Partners were given responsibility for the architectural treatment of all the designs submitted by Dorman Long and Co.³⁴ The partner

responsible for the work was Thomas Tait, who proposed an accomplished stripped classical treatment with strong Art Deco overtones. He also made refinements to the form of the pylons, recommending that the height of the pylons be reduced by 8.3 metres and the front face of the pylon be angled so as to be roughly parallel with the first arch diagonal.35

Although minimal decoration was used in the design of the pylons, the level of decoration was considered appropriate for an engineering project. As described in the 1998 CMP, there are:

... unmistakable Art Deco influences: the use of granite with its lustre and obvious expense, the powerful massing with stepped, battered, symmetrical facades. Perhaps what gives the pylons such a strong Art Deco flavour is their pairing with the zigzag pattern of the steel arch, an effect that has been simplified and accentuated in a thousand souvenir ashtrays.³⁶

In comparison with pure Art Deco buildings soon to appear in Sydney, such as the City Life Assurance Society Building (1936 by Emil Sodersten) and the Anzac War Memorial (1934 by C Bruce Dellit), the design of the pylons is appropriately restrained, given their role in complementing an internationally recognised work of engineering in steel.

In addition to Hell Gate Bridge, there are several other international examples of steel arch bridges of the time that have pylons and/or towers, with granite as the favoured cladding material. The pylons of Camden Bridge in Philadelphia (a 533 metre span suspension bridge completed in 1926) have a number of similar design elements to the SHB pylons, including the use of granite facing, contrasting rock faced and smooth stone, the stepped battered walls and the projecting central balcony (Figure 3.11).

- Heritage Group, Department of Public Works and Services, Sydney Harbour Bridge Conservation Management Plan, prepared for NSW Roads and Traffic Authority, February 1998, p 87. 32. 33. Ammann, OH 1918, 'The Hell Gate Arch Bridge and Approaches', in Transactions of American Society of Civil Engineers, Vol. 82 p 865.
- 34. ibid.
- 35
- Bradfield, John 1933–1934, 'The Sydney Harbour Bridge and Approaches', in Minutes of Proc Inst CE, London, Vol. 238, Part 2, p 333. Heritage Group, Department of Public Works and Services, Sydney Harbour Bridge Conservation Management Plan, prepared for NSW Roads and Traffic Authority, February 1998, p 87.

^{31.} Bradfield, Sydney Harbour Bridge; Report on Tenders, Government Printer, 1924.

Granite faced abutments were also planned for the Bayonne Bridge in New Jersey, but they were never built.³⁷

Pylon towers support cables and other elements of suspension and cable-stayed bridges. Examples of such bridges from the mid-20th century include St Johns bridge, Portland, Oregon (1931) George Washington Bridge, New York City (1931), San Francisco Oakland Bay Bridge (1936) and Golden Gate bridge, San Francisco (1937). Unlike the SHB however, the pylon towers of these bridges have a key structural role as part of the bridge, and unlike the SHB, all of the above examples have exposed steel pylon towers.



Figure 3.11 View of Camden Bridge pylon in Delaware, USA, constructed in 1926.

(Source: Heritage Group, Department of Public Works and Services, Sydney Harbour Bridge Conservation Management Plan, prepared for NSW Roads and Traffic Authority, February 1998, p 84)

 Heritage Group, Department of Public Works and Services, Sydney Harbour Bridge Conservation Management Plan, prepared for NSW Roads and Traffic Authority, February 1998, pp 86–87.

4. Analysis of significance

4.1 Introduction

The SHB was listed on the NSW State Heritage Register (SHR No. 00781) in June 1999 and is subject to the provisions of the Heritage Act 1977 (NSW), which affords protection for State heritage significant items.

In March 2007, the SHB was listed on the National Heritage List (NHL) (Place ID 105888). The legislation that governs the management of a place listed on the NHL is the Environment Protection and Biodiversity Conservation Act 1999 (Cwlth) (EPBC Act) and the Environment Protection and Biodiversity Conservation Regulations 2000 (Cwlth) (EPBC Regulations).

The National Heritage criteria established under Regulation 10.01A of the EPBC Regulations and the State Heritage criteria established by the 'Heritage Council of NSW' (Heritage Council) have been used to identify the National and State Heritage values of the SHB.

The SHB is also listed (in part) as a heritage item under the Sydney LEP 2012, the North Sydney LEP 2001 and the Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005.

4.2 Identifying heritage values and themes

4.2.1 Heritage values

The heritage assessment process endeavours to identify whether a place has heritage values, to establish what those heritage values are, and why the place or element of a place is considered important and of value to the community. Heritage value (also called cultural significance or heritage significance) is embodied in the location, configuration and fabric of a place and/or an element of a place (including its setting and relationship to other items), the records associated with the place and the response that the place evokes in the community.

Identifying the heritage value(s) or heritage significance of a place relies on understanding and analysing documentary evidence, the context and historic themes that apply to a place or item, the way in which its extant fabric demonstrates and embodies its function, and its associations and formal or aesthetic qualities.

The heritage assessment in this section makes reference, where required, to supporting evidence in the earlier sections of this CMP, including Section 2.0 Historic Development and Section 3.0 SHB in Context.

4.2.2 Australian and State historical themes

The Australian Historic Themes Framework can be used at the national, state or local level to assist in the identification and assessment of heritage significance, interpretation and management of heritage places. It assists in understanding the comparative context of places of historical significance around Australia.

The framework is comprised of nine theme groups which encompass and are elaborated by a network of more specific sub-themes. The NSW Heritage Manual identifies a specific set of 'Historical Themes relevant to New South Wales' within which the heritage values of the place can be examined.

The themes relevant to the SHB and adopted in the 'Sydney Harbour Bridge Interpretation Plan 2007'¹ emphasize the need to understand the building of the SHB in its immediate landscape context from the extensive demolitions for the approaches on both sides of the harbour to its ongoing functional role in Sydney's overall transportation system. Relevant themes for the SHB are summarised in the table to the right:

1. Godden Mackay Logan, Sydney Harbour Bridge Interpretation Plan, prepared for NSW Roads and Traffic Authority, 2007.

Table 4.1 Australian and NSW Historical Themes in relation to the SHB.

Australian Theme	NSW Theme
Economy - Developing local, regional and	Events—Activities and processes that mark the consequences of natural and cultural occurrences.
national economies.	Technology—Activities and processes associated with the knowledge or use of mechanical arts and applied sciences.
	Transport—Activities associated with the moving of people and goods from one place to another, and systems for the provision of such movements.
Settlement - Building settlements, towns and cities.	Towns, suburbs and villages—Activities associated with creating, planning and managing urban functions, landscapes and lifestyles in towns, suburbs and villages.
Working - Working.	Labour—Activities associated with work practices, organised and unorganised labour.
Governing - Governing.	Government and Administration—Activities associated with the governance of local areas, regions, the state, the nation and the administration of public programs—includes both principled and corrupt activities.
Phases of Life—Marking the phases of life.	Persons—Activities of, and associations with, identifiable individuals, families and communal groups.

4.3 Assessment criteria

This section outlines the current assessment criteria for evaluating whether a place has National Heritage values and/or State Heritage values.

4.3.1 National heritage criteria

A place identified as having outstanding heritage values is eligible for inclusion in the National Heritage List. In addition to governing the assessment and management of a state place's heritage values, the EPBC Act prescribes that a place has National Heritage value if it meets one of the National Heritage criteria specified in EPBC Regulation 10.01A. The reason that enables a place to meet the criteria is defined in Section 324C of the EPBC Act as the National Heritage value of the place.

The EPBC Regulation 10.01A defines nine National Heritage criteria for evaluating, identifying and assessing the National Heritage values of a place. The threshold for inclusion on the NHL is that a place meets one or more of the National Heritage criteria listed below:

Criterion A – Historic: the place has
 outstanding heritage value to the nation
 because of the place's importance in the

course, or pattern, of Australia's natural or cultural history

- Criterion B Rarity: the place has outstanding heritage value to the nation because of the place's possession of uncommon, rare or endangered aspects of Australia's natural or cultural history
- Criterion C Scientific: the place has outstanding heritage value to the nation because of the place's potential to yield information that will contribute to an understanding of Australia's natural or cultural history
- Criterion D Representative: the place has outstanding heritage value to the nation because of the place's importance in demonstrating the principal characteristics of:
 - (i) a class of Australia's natural or cultural places; or
 - (ii) a class of Australia's natural or cultural environments
- Criterion E—Aesthetic: the place has outstanding heritage value to the nation because of the place's importance in exhibiting particular aesthetic characteristics valued by a community or cultural group

- Criterion F—Creative/Technical: the place has outstanding heritage value to the nation because of the place's importance in demonstrating a high degree of creative or technical achievement at a particular period
- Criterion G—Social: the place has outstanding heritage value to the nation because of the place's strong or special association with a particular community or cultural group for social, cultural or spiritual reasons
- Criterion H—Associative: the place has outstanding heritage value to the nation because of the place's special association with the life or works of a person, or group of persons, of importance in Australia's natural or cultural history
- Criterion I—Indigenous: the place has outstanding heritage value to the nation because of the place's importance as part of Indigenous tradition.

In February 2006, Clive Lucas (of Stapleton and Partners Pty Ltd) completed a report² commissioned by the then RTA to assess the possible National heritage values of the SHB and the potential implications, should the SHB be included on the NHL. The report identified that the SHB merited inclusion on the NHL and, in August 2006, the SHB was nominated for inscription on the NHL. The SHB was inscribed on the NHL on 19 March 2007 to coincide with the 75th anniversary of its opening.

Determination of whether a place has National heritage values is a matter for the Minister administering the EPBC Act (the 'Commonwealth Minister'), as advised by the Australian Heritage Council (Section 324J (1) of the EPBC Act). For places listed on the NHL, the National heritage values should be managed by conservation policies prepared to protect these values. The conservation policies for the National heritage values of the SHB are set out in Section 7.0.

4.3.2 New South Wales State Heritage Register criteria

To be assessed for listing on the State Heritage Register (SHR), an item will, in the opinion of the Heritage Council, meet one or more of the following criteria:

- Criterion A: An item is important in the course, or pattern, of NSW's cultural or natural history
- Criterion B: An item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history
- Criterion C: An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW
- Criterion D: An item has strong or special association with a particular community or cultural group in NSW for social, cultural or spiritual reasons
- Criterion E: An item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history
- Criterion F: An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history
- Criterion G: An item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places or environments.

For places listed on the SHR, conservation policies need to be prepared to protect the values identified under these criteria. The policies formulated for the SHB are set out in Section 7.0 of this CMP.

4.4 Evaluation

The thresholds required to meet each of the State and National heritage criteria establish varying levels of importance for each type of value (eg history, rarity, etc). For example, at a

2. Clive Lucas, Stapleton and Partners Pty Ltd, Sydney Harbour Bridge Assessment of National Heritage Values, prepared for NSW Roads and Traffic Authority, February 2006.

National level, a place must have outstanding heritage values; at a State level, a place must be important to New South Wales.

The following assessment considers the SHB under both the National heritage and State heritage criteria, and evaluates how the SHB may meet each of these. While the SHB is listed on LEPs and non-statutory lists (refer to Section 1.3.1), the significance of the SHB under these listings will not be addressed as part of the following discussion.

In an assessment of significance for both NHL and the SHR, if a place were to meet National heritage criteria, it could be assumed that it would also meet the State Heritage criteria. However, a place that meets a criterion at the State level will not necessarily meet that (or a related) criterion at the National level. Therefore, separate heritage significance assessments for the SHB have been prepared to address the NHL and SHR criteria.

The SHB is measured against each criterion, and this analysis is incorporated in the Statement of Significance in Section 4.5. There are some differences between the significance of the SHB at the National level in this CMP and the assessment prepared by the then Department of the Environment, Water, Heritage and the Arts (now the Department of Environment and Energy). However, these differences do not affect the overall assessment of the SHB as meeting the criteria for National significance under the five criteria under which it was inscribed in 2007.

The following assessment is a synthesis of the NHL and SHR heritage significance assessments for the SHB. It may provide some additional information under each criterion; however, it relies on the conclusions of:

 Heritage Group, Department of Public Works and Services, Sydney Harbour Bridge Conservation Management Plan, prepared for NSW Roads and Traffic Authority, February 1998

- Clive Lucas, Stapleton and Partners Pty Ltd, Sydney Harbour Bridge Assessment of National Heritage Values, prepared for NSW Roads and Traffic Authority, February 2006
- International Conservation Services, Sydney Harbour Bridge Movable Heritage Conservation Strategy, 2007
- Heritage listing information as attached in Appendix A.

4.4.1 Historic

NHL – Criterion A: The place has outstanding heritage value to the nation because of the place's importance in the course, or pattern, of Australia's natural or cultural history.

SHR – Criterion A: An item is important in the course, or pattern, of NSW's cultural or natural history.

National heritage values

- The SHB was a remarkable feat of bridge engineering and construction, especially for a young nation that had previously not taken on a project of this scale and complexity. Even today, it continues to be the widest long-span bridge in the world and is recognised as the world's greatest steel arch bridge because of its combination of size, load bearing capacity and the difficulties overcome in its construction.
- The SHB is a symbol of national pride. At the time of its construction, it represented progress and modernity and symbolised Australia's industrial maturity, particularly as it was constructed with extensive use of Australian engineering expertise, materials and labour.
- For Australians, the building of the SHB was seen as a great achievement and a symbol of hope at a time of worldwide depression.

State heritage values

 The SHB was the outcome of the personal vision and commitment of Dr JJC Bradfield, Chief Engineer, SHB, City Transit and Metropolitan Railway Construction, and the leading figure in the development of Sydney's transport system in the first part of the twentieth century.

- The SHB has been in continuous use since 1932 as the main road, rail, pedestrian and cycle connection across Sydney Harbour. Together with the city railway system, it constituted a radical expansion of Sydney's transportation network.
- The construction of the SHB allowed a major acceleration in the growth of the northern residential suburbs of metropolitan Sydney, particularly in the post-World War II years, as well as the extension of the Central Business District into North Sydney in the 1960s and 1970s.
- The SHB approach spans provide the physical evidence of extensive urban redevelopment within The Rocks/ Milsons Point precinct and the wider North Sydney precinct. Large parts of the early subdivision patterns and built forms in both of these early precincts of Sydney were demolished prior to the construction of the SHB.
- The SHB approach spans and roadways (especially the Warringah Freeway at North Sydney) truncated established and homogeneous neighbourhoods, creating distinctive precincts whose land use and built forms developed separately.
- The construction of the SHB consumed a major portion of the public works capacity and budget of New South Wales, and was a very significant undertaking for the public sector at the time.
- The SHB became an early focal point for political tensions and national celebrations, starting with the De Groot incident in 1932; and more recently the 'Walk for Reconciliation' in 2000, the Sydney Olympic Games in 2000 and the annual role it continues to play as part of New Year's Eve and Australia Day celebrations.
- The SHB Movable Heritage Collection comprises a range of components and

materials which are physical evidence of the construction of the SHB, and illustrate aspects of the technologies in use at the time. The collection also contains journals and documents which provide a historical record of the presence and activities of individual people involved in the construction of the SHB in both Australia and England. The range of original material such as newspaper 'special' supplements, published books and souvenir editions; as well as badges, postcards and pictures manufactured during and following the construction of the SHB, illustrate the role and perceptions of the SHB in the community at the time.

- The SHB Movable Heritage Collection includes evidence of the activities associated with the celebrations in 1982 for the fiftieth anniversary of the opening of the SHB, a major public event in its day and an important affirmation of the singular attachment that Sydneysiders have for the SHB, both as a public facility and as an icon of the city. The collection also contains evidence of the activities associated with the celebrations for the Australian Bicentennial in 1988.
- The SHB Movable Heritage Collection includes a range of toll collection and maintenance equipment, redundant operating fittings and workshop memorabilia which provide evidence of the ongoing activities carried out in regard to the SHB; and are demonstrative of the SHB's ongoing historical and other importance to Sydney and New South Wales.
- The SHB Movable Heritage Collection comprises items that were specifically set aside for preservation as part of the record of the construction of the SHB. Collectively the items represent the society in which the SHB was built and the reaction of that community to the completion of the SHB. The items associated with the Opening Day ceremonies provide a unique and original
record of Sydney society in that period, illustrating elements of the organisation of the Opening Day commemorations, including the production of a range of small and personal items expressive of the human scale and the individuals that were involved.

4.4.2 Rarity

NHL – Criterion B: The place has outstanding heritage value to the nation because of the place's possession of uncommon, rare or endangered aspects of Australia's natural or cultural history.

SHR – Criterion F: An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history.

National heritage values

- The scale and engineering expertise evident in the structure of the SHB is unique in Australia.
- However, the SHB is not listed under criterion B on the NHL.

State heritage values

- The SHB is a uniquely important development in Sydney's transportation network.
- As it introduced a main road and rail connection across Sydney Harbour, the SHB was the single most important factor in the expansion of metropolitan Sydney north of the harbour.
- The SHB Movable Heritage Collection is a collection of rare surviving relics relating to the construction methodology, technology and materials of the SHB, assembled as part of the overall construction program; the first time in Australia that the construction of the SHB had been approached in this manner.
- The SHB Movable Heritage Collection comprises original relics of the ceremonies and celebrations for the Opening Day of the SHB and represents a rare record of Sydney society in the period during the construction of the

SHB. It also contains rare surviving relics of the fiftieth anniversary celebrations of the SHB and the Bicentennial celebrations in 1988.

Figure 4.1 Closing of the SHB arch in 1930.



(Source: Mitchell Library, Hood Collection DG ON4 2185)

Figure 4.2 Photograph of traffic on the SHB taken by David Moore in 1947.



(Source: National Library of Australia, PIC P2102/1-85)

Figure 4.3 Working conditions in 1949 for SHB painters.



(Source: Roads and Traffic Authority)

Figure 4.4 Working conditions in 1998 for SHB painters.



(Source: Roads and Traffic Authority)

4.4.3 Scientific/research

NHL – Criterion C: The place has outstanding heritage value to the nation because of the place's potential to yield information that will contribute to an understanding of Australia's natural or cultural history.

SHR – Criterion E: An item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history.

National heritage values

- The SHB has the potential to contribute to the understanding of very large scale construction methods and materials of the 1920s and 1930s, especially the use of high quality structural steel.
- However, the SHB is not listed under criterion C on the NHL.

State heritage values

- The SHB allows for the understanding of working conditions in the 1930s.
- The archaeological remains in Dawes
 Point have the potential to yield further
 information about the early development
 of this very historic area of Sydney,
 particularly the Dawes Point Battery
 and later alterations.

 The SHB Movable Heritage Collection contains original fabric elements such as the samples of original steel shavings and rivets, which provide a future opportunity for materials testing and analysis without the requirement for taking samples directly from the standing structure.

4.4.4 Representativeness

NHL - Criterion D: the place has outstanding heritage value to the nation because of the place's importance in demonstrating the principal characteristics of (i) a class of Australia's natural or cultural places; or (ii) a class of Australia's natural or cultural environments.

SHR – Criterion G: An item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places or environments.

National heritage values

- The SHB is representative of a conventional two-hinged arch bridge design, but of a scale and detail execution that makes it an outstanding work of engineering at the international level.
- Although completed in 1932, the SHB is substantially unaltered, retaining the clarity and integrity of the original design of the arch, pylons, approach spans and detail components.
- The image of the SHB in its harbour setting has become an internationally recognised emblem representing both Australia and the city of Sydney.
- The SHB is representative of a range of major public works projects undertaken in Australia and in other countries during the Depression era.
- However, the SHB is not listed under criterion D on the NHL.

State heritage values

• The SHB is representative of a significant stage in the development of Sydney and associated changes in modes of transport, including the growing reliance on private motor vehicles.

- The SHB Movable Heritage Collection comprises components and materials which are representative of the technologies in use at the time and utilised for the construction of the SHB. It contains tools, instruments, documents and equipment used in the fabrication and construction of the SHB which are representative of the specialised technology of the period and illustrate typical processes used during the manufacture, installation and testing of the SHB. The collection also comprises equipment representative of the ongoing operation and maintenance operations of the SHB, including toll collection.
- The SHB Movable Heritage Collection contains original memorabilia of the ceremonies and celebrations for the Opening Day of the SHB, such as newspaper special supplements, published books and souvenir editions, as well as badges, postcards and pictures. This material is representative of the aesthetic and cultural context during the construction of the SHB, as well as of the media technologies and materials prevalent at the time.

4.4.5 Aesthetic

NHL – Criterion E: The place has outstanding heritage value to the nation because of the place's importance in exhibiting particular aesthetic characteristics valued by a community or cultural group.

SHR – Criterion C: An item is important in demonstrating aesthetic characteristics and/ or a high degree of creative or technical achievement in NSW.

National heritage values

- The steel arched form, Art Deco inspired granite pylons and composite approach spans create an iconic and dramatic composition that consistently evokes a positive response from observers.
- The SHB is seen as a major element of one of the most internationally recognised views of Australia and the

city of Sydney; which also comprises the SOH, the harbour, its foreshores and the city skyline.

- The SHB is a popular motif for tourist products and other items intended to portray an 'Australian' image.
- The dramatic aesthetic quality of the SHB and its setting has, since the commencement of its construction, been an inspiration to artists, photographers and film-makers. It was, and continues to be, the subject of many works of Australian art, captured by acclaimed artists such as Grace Cossington-Smith and Roland Wakelin.

State heritage values

- The SHB is a monumental landmark in the centre of the city of Sydney and an important visual element in the cityscape when viewed from many key points within the city.
- The pylons designed by English Architect, Thomas Tait, exhibit a sophisticated degree of Art Deco design influence comparable to other examples in Sydney and New South Wales, such as the former Maritime Services Board building and the Hyde Park War Memorial.
- The sweeping curve of the northern approach spans exhibits a dramatic aesthetic quality and is the subject of many works of art and photos.
- The consistent detailed treatment of the components that comprise the approaches (ie arched and flat-topped voids utilised as tenancies, retaining walls, balustrades, steps and lighting) makes a major contribution to the streetscapes of Milsons Point and The Rocks/Millers Point.
- The SHB Movable Heritage Collection contains a range of items which are expressive of the precision of work and attention to detail undertaken for the construction of the SHB. The collection provides a human dimension to the SHB,

highlighting the people involved in its design, manufacture and construction.

 The SHB Movable Heritage Collection comprises documentary and photographic evidence of the progressive construction of the SHB; and is illustrative of the people and fabric of Sydney at the time of its construction and opening. The collection includes documentary evidence of the style, materials and presentation of official and government invitations, certificates and programs from the time of the completion of the SHB.

4.4.6 Creative or Technical

NHL – Criterion F: The place has outstanding heritage value to the nation because of the place's importance in demonstrating a high degree of creative or technical achievement at a particular period.

SHR – Criterion C: An item is important in demonstrating aesthetic characteristics and/ or a high degree of creative or technical achievement in NSW.

National heritage values

- The SHB demonstrates outstanding engineering design and technical achievement, especially given the difficulties overcome in its construction. This achievement is particularly notable for a young nation that had previously not taken on a project of this scale and complexity.
- The SHB is recognised as the world's greatest example of a two-pin steel arch design, with its combination of size, load bearing capacity and the use of high quality structural steel in the construction of the arch. The SHB also contains the heaviest steelwork of its kind ever constructed.

State heritage values

 The approach span arches, slabs and retaining walls of the SHB are important examples of the use of in situ reinforced concrete on a massive scale, combined with the fine scale use of the material for detail components such as balustrades, step and bass relief decoration.

- The scale and design of the viaducts forming the approach spans to the SHB are notable within the New South Wales context.
- The masonry pylons of the approach spans designed by the English Architect, Thomas Tait, exhibit a sophisticated degree of Art Deco design influence comparable with other examples in Sydney and New South Wales.
- The SHB Movable Heritage Collection commemorates the technical achievement evident in the design and construction of the SHB. It contains steel samples, rivets, bolts and examples of the instruments utilised for the fabrication of components for the SHB. The tools and equipment used by Dorman Long Company in the fabrication and construction of the SHB are also illustrative of the processes used during the manufacture, installation and testing of the SHB.

Figure 4.5 View of the SHB arch.



(Source: Roads and Maritime 2007)

Figure 4.6 View of the SHB deck.



(Source: Roads and Maritime 2007)



Figure 4.7 View of the SHB approach spans.

(Source: Roads and Maritime 2007)

Figure 4.8 View of the SHB piers at Bradfield Park and the bridge curve.



(Source: GML 2013)

4.4.7 Social

NHL – Criterion G: The place has outstanding heritage value to the nation because of the place's strong or special association with a particular community or cultural group for social, cultural or spiritual reasons. SHR – Criterion D: An item has strong or special association with a particular community or cultural group in NSW for social, cultural or spiritual reasons.

National heritage values

- Since 1932, the SHB has been an internationally recognised symbol of modern Australia, and its iconic shape has been used as the inspiration for countless decorative objects, ornaments and tourist products.
- The SHB is synonymous with the names of a broad range of personalities associated with either its construction or subsequent history, for example, Premier Jack Lang, De Groot and Paul Hogan.

State heritage values

- The SHB is a focal point for cultural events and national celebrations, as exemplified by the 'Walk for Reconciliation' in 2000, the Sydney Olympic Games in 2000, the Sydney Running Festival, Bicycle NSW's Spring Cycle and the annual role it continues to play as part of Sydney's New Year's Eve and Australia Day celebrations.
- As a major public work of the time, the SHB represented a substantial investment by the taxpayers of New South Wales, and the toll still paid by motorists crossing the SHB is a constant reminder to the citizens of New South Wales of the huge cost burden imposed by its construction.
- The construction of the SHB affected the lives of almost a generation of workers, and its role during the Depression as the so-called 'Iron Lung', which provided employment and protected workers and their families from hardship or 'the dole', is still remembered.
- The SHB was an important factor in the pattern of growth of metropolitan Sydney, particularly in allowing the opening up of the northern suburbs for residential development.

- The SHB Movable Heritage Collection contains items which are family heirlooms and memorabilia associated with the SHB that were collected or retained by members of the public and which would continue to be considered valuable to the families of these people.
- The SHB provides a reference point for the families and descendants of those who worked on its design and construction, its opening and subsequent operation over seventy years.
- Movable heritage items associated with the SHB have a strong social significance for those who worked on the SHB, the staff of the then RTA as the custodians of the SHB, and to residents of Sydney who in the past watched the SHB being constructed and still use the SHB today.

4.4.8 Association

NHL - Criterion H: The place has outstanding heritage value to the nation because of the place's special association with the life or works of a person, or group of persons, of importance in Australia's natural or cultural history.

SHR – Criterion B: An item has strong or special association with the life or works of a person, or group of persons of importance in NSW's cultural or natural history.

National heritage values

• The image of the SHB in its setting, including the SOH and the harbour, is recognised internationally as an icon of Australia and the city of Sydney.

State heritage values

 The SHB has strong associations with Dr JJC Bradfield, who was primarily responsible for its conception, design and construction. Bradfield was the Chief Engineer, SHB, City Transit and Metropolitan Railway Construction, and the leading figure in the development of Sydney's transport system in the first part of the twentieth century.

- The construction of the SHB is also associated with the British team of engineers, Sir Ralph Freeman, and contractors Dorman Long and Co. The SHB was the outstanding work of Freeman's career but his contribution was marred by a dispute with Bradfield regarding who was actually responsible for its design.
- The SHB has strong associations with the families and descendants of the workers who built it, and who recognise its role during the Depression as the so-called 'Iron lung', providing employment and protection from hardship or 'the dole' (see Figure 4.11).
- The items in the SHB Movable Heritage Collection are memorabilia of the ceremonies and celebrations for the Opening Day of the SHB and are associated with the people from all classes who participated in the Opening Day events and activities.
- The technical items and instruments within the SHB Movable Heritage Collection were used by staff and workers associated with the construction and maintenance of the SHB, sometimes over many years.

Figure 4.9 View of NLA crowds crossing SHB during the 'Walk for Reconciliation' in 2000.



(Source: National Library of Australia PIC NL 38683/20/24a)

Figure 4.10 View of fireworks from SHB during New Year's Eve celebrations in 2006-2007. The theme, 'A Diamond Night In Emerald City' was created to celebrate the SHB's 75th anniversary or Diamond Jubilee in 2007. The coathanger in the display is in reference to the SHB's nickname.



(Source: City of Sydney Council)

4.5 Statement of significance

The following Statements of Significance summarises the National and State Heritage values of the SHB as determined under the criteria listed above.

4.5.1 National heritage values

The SHB is of outstanding heritage value as a feat of bridge engineering and construction, especially for a young nation that had previously not taken on a project of this scale and complexity. Even today, it continues to be the widest long-span bridge in the world and is recognised as the world's greatest steel arch bridge because of its combination of size, load bearing capacity and the difficulties overcome in its construction.

The SHB is a symbol of national pride. At the time of its construction, it represented progress, modernity and symbolised Australia's industrial maturity, particularly as it was constructed with extensive use of Australian engineering expertise, materials and labour. For Australians, the SHB was seen as a great achievement and a symbol of hope at a time of the worldwide Depression. The steel arched form, Art Deco inspired granite pylons and composite approach spans create an iconic and dramatic composition that consistently evokes a positive response from observers. The SHB is seen as a major element of one of the most internationally recognised views of Australia and the city of Sydney; which also comprises the SOH, the harbour, its foreshores and the city skyline. Its iconic shape has been used as the inspiration for countless decorative objects, ornaments and tourist products.

The dramatic aesthetic quality of the SHB and its setting has, since the commencement of its construction, been an inspiration to artists, photographers and film-makers. It was, and continues to be, the subject of many works of Australian art, captured by acclaimed artists such as Grace Cossington-Smith and Roland Wakelin.

Figure 4.11 View of SHB with the SOH in the foreground.



(Source: National Library of Australia)

4.5.2 State heritage values

The SHB is a monumental landmark in the centre of the city of Sydney and an important visual element in the cityscape when viewed from many key points around the harbour.

The SHB was the outcome of the personal vision and commitment of Dr JJC Bradfield, Chief Engineer, SHB, City Transit and

Metropolitan Railway Construction, and the leading figure in the development of Sydney's transport system in the first part of the twentieth century. It is also associated with the British team of engineers, Sir Ralph Freeman, and contractors Dorman Long and Co. Its construction consumed a major portion of the public works capacity and budget of New South Wales, and was a very significant undertaking for the public sector at the time.

Figure 4.12 View looking towards the Sydney CBD from SHB.



(Source: Roads and Maritime 2007)

The SHB remains synonymous with the names of a broad range of personalities associated with either its construction or subsequent history, for example, Premier Jack Lang, De Groot and Paul Hogan.

The approach span arches, slabs and retaining walls of the SHB are important examples of the use of in situ reinforced concrete on a massive scale, combined with the fine scale use of the material for detail components such as balustrades, step and bass relief decoration. The scale and design of the viaducts forming the approach spans to the SHB are also notable within the New South Wales context. The masonry pylons of the approach spans designed by the English Architect, Thomas Tait, exhibit a sophisticated degree of Art Deco design influence comparable with other examples in Sydney and New South Wales.

The SHB has been in continuous use since 1932 as the main road and rail connection

across Sydney Harbour. Together with the city railway system, it constituted a radical expansion of Sydney's transportation network, and allowed a major acceleration in the development of the northern residential suburbs, particularly in the post-World War II years, as well as the extension of the Central Business District into North Sydney in the 1960s and 1970s.

The SHB approach spans provide the physical evidence of extensive urban redevelopment within The Rocks/Milsons Point precinct and the wider North Sydney precinct where large parts of the early subdivision patterns and built forms were demolished prior to the construction of the SHB. The SHB approach spans and roadways (especially the Warringah Freeway at North Sydney) truncated established neighbourhoods, creating distinctive precincts whose land use and built forms developed separately.

The construction of the SHB affected the lives of almost a generation of workers, and its role during the Depression as the so-called 'Iron Lung', which provided employment and protected workers and their families from hardship or 'the dole', is still remembered.

The SHB became an early focal point for political tensions and national celebrations, starting with the 'De Groot' incident in 1932; and more recently the 'Walk for Reconciliation' in 2000, the Sydney Olympic Games in 2000, and the annual role it continues to play as part of New Year's Eve and Australia Day celebrations.

In terms of archaeological value, the surviving standing walls at Bradfield Park have the potential to yield further information about the early residential and commercial occupation of Milsons Point; and the archaeological remains in Dawes Point have the potential to yield further information about its early development, particularly the Dawes Point Battery and later alterations.

The SHB Movable Heritage Collection is

significant as a collection of relics associated with the design, construction, official opening and ongoing operation of the SHB. The collection contains the only known relics of the temporary support structure utilised for the erection of the arch steelwork, and evidence of the operations carried out in England for the construction of the SHB.

The collection includes items which are significant as representative examples of the materials, technical instruments, technical documentation, components and manufacturing outputs associated with the construction of the SHB. It also contains examples of unique and specialised documents and objects used in association with the Opening Day social activities and celebrations, which are themselves evidence of the social customs and attitudes of the time. The collection contains exhibits which showcase the wide range of objects, activities and publications inspired by or produced in association with the operations of the SHB throughout its history.

Some exhibits in the collection also have value as relics of their period, illustrating aspects of the social context, mores and activities of Sydney at the time of the construction of the SHB. The SHB Movable Heritage Collection demonstrates the ways in which icons of the era were commemorated through retention of specific materials and objects, and illustrates the social importance of the SHB at the time of construction.

4.6 Grades of significance

4.6.1 Significance of components

Different components of a place may make a different relative contribution to its heritage value. Loss of integrity or poor condition may also diminish significance. Specifying the relative contribution of an item or its components to overall significance provides a useful framework for decision-making about the conservation of and/or changes to the place. The NSW Heritage Office's publication Assessing Heritage Significance (2001) sets out terms used to describe the degrees (or grades) of significance for different components of a place (see Table 4.2 below).

In summary, by applying the standard gradings to the major components of the SHB; the arch, pylons and approach spans are of Exceptional significance as they comprise the most recognisable components of the SHB and contribute directly to its significance. Although the approach spans are less significant structurally than the arch and the pylons, they form the connection to the shores on each side and are a vital component of the SHB. The approaches are also of Exceptional significance because, although subsidiary to the arch section of the SHB and of less engineering interest, they were constructed as an integral part of the original SHB composition of elements.

Grading	Justification	Status
Exceptional (E)	Rare or outstanding element directly contributing to an item's Local and State significance.	Fulfils criteria for Local or State listing.
High (H)	High degree of original fabric. Demonstrates a key element of the item's significance. Alterations do not detract from significance.	Fulfils criteria for Local or State listing.
Moderate (M)	Altered or modified elements. Elements with little heritage value, but which contribute to the overall significance of the item.	Fulfils criteria for Local or State listing.
Little (L)	Alterations detract from significance. Difficult to interpret.	Does not fulfil criteria for Local or State listing.
Intrusive (I)	Damaging to the item's heritage significance.	Does not fulfil criteria for Local or State listing.

Table 4.2 Standard grades of significance and their application to the SHB.

4.6.2 Schedule of significant forms and fabric

Tables 4.3 and 4.4 provide a schedule of the SHB's significant fabric and forms. The tables have been compiled using the information extracted from Section 4.5 of the 1998 CMP.¹¹⁶ A reference to the relevant Inventory Record is included in brackets after each item in the schedules.

Table 4.3 Grading of significant forms.

Grading	
Bridge Component	Exceptional (E)
Arch and pylons (Precincts 2, 3 and 4)	 Overall form of the main arch structure, including: the pattern of the steel structural members (3.1). the clear spaces between the arch end posts and pylons (A.8, 3.1); and the clear space between the deck and the water (3.1). The exterior form and detail of the granite clad pylons and pylon towers (A.8).
Approach spans (Precincts 2 and 4)	 Overall form of the approach spans, including: the pattern of the steel structural members (A.7); the exterior form and detail of the granite clad piers (A.7); and the open spaces under the approach spans (A.7).
Approaches (Precincts 1 and 5)	 Overall form of the approaches, including: the rendered retaining walls divided into bays (A.9, 5.1); the four concrete arch bridges of the northern approaches (Arthur, Burton, Fitzroy, Lavender Streets (5.3); the exterior form and detail of the three arch viaduct of the southern approaches (5.1, 5.2); and the arch bridge over Argyle Street (5.1, 5.3). The concrete abutments at the ends of the approaches adjacent to the approach spans. The 10 flat-topped occupancies between Middlemiss Street and the Pacific Highway.
The setting	 Existing unobstructed views of the SHB and approach spans, including: views of the SHB end-on from the northern and southern approach roads; views of the SHB from ground level nearby and from the water; and views of the steel structure and pylons from deck level. the setting of Bradfield Park as it affords uncompromised views of the SHB from ground level (2.1). Dawes Point (Tar-ra) Park

High (H)	Moderate (M)	Little (L)	Intrusive (I)
The main interior configuration and spaces of the pylons (A.8).			
Dawes (Tar-Ra) Point Park and the King George V Memorial (4.1)			
The 17 bays of flat-topped occupancies in Ennis Road.		The form of internal alterations, mezzanines etc (5.1)	

Table 4.4 Grading of significant fabric.

	Grading		
Bridge Component	High (H)		
Arch and approach spans (Precincts 2, 3 and 4)	 All steelwork of the trusses, lateral bracing and hangers, portal frames at end posts, floor laterals, cross girders, stringers, joists and bearings (A.7, 3.1). Lattice steel fences/balustrades (3.1). Lighting/overhead cable supports, steel cantilever arms (A.1, A.7). All original access equipment, painting cranes, gantries, stairs, ladders, catwalks and handrails (A.7, 3.1, 3.2, 3.3). Coke concrete filling on pressed steel troughs (A.3, 3.1). Steel curb plates, cast iron scuppers and gratings (A.3, A.7, 3.1). Any original railway components: 'trainstop' devices, signals, signage (A.2). The position of two steel and aluminium flag poles and flags at the crown of the arch, the Australian flag at the east and the N.S.W. flag at the west (3.1). Bronze plaques (A.5). 		
Pylons, piers and associated elements (Precincts 2 and 4)	 Granite facing and concrete structure of walls, piers, floors and roofs (A.8). Original windows and doors (A.8). Bronze plaques (A.5, A.8). Pylon interior stairs, handrails and balustrades (A.8). External sandstone and concrete stairs, handrails and balustrades (A.8). Moveable heritage within south east pylon museum and lookout and pylon workshops and storerooms (A.8). 		

Moderate (M)	Little (L)	Intrusive (I)
 Steel tower supporting the air navigation beacon (3.1). Evidence of conversion from tramway to roadway (A.2, A.3). Pitched roofed sheds at mid-span. Suicide fence above outer footway fences (3.2). Reproduction light fittings to roadway. 	 Communication equipment, navigation beacons and lights, aerial, shipping navigation signs (3.4) Wearing surfaces of road, rail, foot and cycle ways (A.2, A.3). Railway tracks, concrete sleepers, timber transoms, overhead power cables, modern signalling equipment, 'Cologne eggs' (A.2, 1.5) Steel lamp posts with curved arms (A.1). Later additions to catwalks and gantries (A.7). Water and compressed air pipes, power cables (A.7). Flood lighting on approach spans. Replacement painting cranes installed in 1997 (3.3). Expanded metal gantry decking (3.3). Expanded metal gantry decking (3.3). Emergency telephone system and radio control system (3.4). 	 Full weight concrete over area of previous tram tracks (A.2, A.3, A.7, 3.1). Modern light fittings on cantilever brackets (A.1, A.7). Modern security cameras on pedestrian walkways (A.7). Modern security fences and security barriers (excluding suicide fences) (A.7, 3.2) Modern catwalks and ladders (3.2). New personnel lift at south-east and north-east end post (3.1). Roadway crash barriers (A.3, 3.2). Barbed wire around the fences to the upper and lower chord stairs and elsewhere (3.2). Post-1997 safety cables used by the SHB Concessionaire personnel (3.2).
 Timber windows in blockhouses on top of pylons (A.8). World War II parapets and evidence of gun emplacements on top of pylon blockhouses (A.8). Evidence of the public use of pylon lookouts (eg brass direction finder on balustrade of lookout, vestiges of the Bradfield Museum) (A.8). Early fitout of pylons for maintenance staff use, including tools and machinery (A.8) 	 Recent internal alterations to pylons (eg RailCorp Signals Communications Room in southwest pylon tower, tunnel ventilation equipment, internal roof and amenities in the north pylon) (A.8). Roof over southern workshop area (A.8). South pylon works office and amenities from the 1960s (A.8). 	 Rust stains on pylons (mostly due to brake dust from trains) (A.8). Yellow metal panels around entrance to pylon lookout and museum (A.8, 3.2). Security fences from the foot / cycleways to the compounds, around the main bearings and the pylon stairs (A.8, 3.2). Polycarbonate windows at balcony level (A.8).

	Grading		
Bridge Component	High (H)		
Approaches (Precincts 1 and 5)	• All original structural elements supporting the railway and roadway: retaining walls, concrete arched occupancies and bridges, flat-topped beam and slab construction and dividing walls (A.9, 1.1, 1.2, 1.3, 1.4, 5.1, 5.2, 5.3).		
	• The arch bridges over Arthur, Burton, Fitzroy & Lavender Streets (1.3)		
	Off-form concrete arch above Argyle Street (1.3, 5.3).		
	 Rendered architectural elements (eg walls, parapets, pilasters and spandrels) (A.9, 1.1, 1.2, 1.3, 1.4, 5.1, 5.2, 5.3). 		
	 Former toll house near Argyle Street, original elements (A.4) 		
	Ennis Road awnings bays 12-18 (1.3).		
	 Hickson Road retaining wall (4.2).Cable tunnel and cable shelves (Argyle Street arch) (5.3). 		
	• Bridge stairs: the whole of the rendered reinforced concrete structure of the southern and northern stairs on both eastern and western sides, pilasters, arches, parapets, ornamentation and lettering, carborundum cement treads, risers and landings. (A.6).		
	Vestiges of tram station (eg stairs). (1.3)		
	Vestiges of tram tunnels (A.6).		
	Bronze plaques (A.5, A.6).Switch room doors, cable tunnel and shelves (A.6)		
	Original light fittings including: Bronze lanterns on Lavender Street arch (Type A (A1)		
	Cast iron lanterns and concrete posts on bridge stairs (Type D) (A.6) (A.1):		
	Type E fitting on Toll House (A.1);		
	Type F fittings on Milsons Point Station (A.1).		
	Recessed lights in the subway (A.6)		
	• Movable heritage in the Museum (5.2).		
Argyle Street substation	 Rendered walls, use of tiles on roofs, steel windows and doors (5.4). 		
and switch house	Original internal divisions, mezzanines, etc.(5.4)		
(Precinct 5)	Travelling crane (5.4).		
	Brick cable ducting and timber doors (5.4).		
	Original Bridge Lighting Chart (5.4).		
	Vestiges of original control panel (5.4).		
	Original desk and phone box (5.4).		
	Blue glass windows (5.4).		
	• AC Switch House-walls, hoors, rool, salvaged timber doors, steel window frames, emergency light fittings, original switchgear and maintenance trollevs (5.4).		
	• A single example of the Reyrolle Switch (5.4).		
	• Vestiges of the garden, including concrete and sandstone edging (5.4).		
Wynyard former tram tunnels (Precinct 5)	• Two concrete lined arched tram tunnels (1.1, 5.1).		
The rail huts	Small huts located between the tracks used to house equipment for workers.		

Moderate (M)	Little (L)	Intrusive (I)
 Occupancy front and rear walls, concrete canopies, steel windows and original glazing (1.2, 1.3, 5.1, 5.2). Awnings except Ennis Road bays 12-18 (1.2, 1.3, 5.2). Internal mezzanines, services and other internal alterations to Occupancies (1.1, 1.2, 1.3, 5.1, 5.2). Original stormwater drainage systems (1.1, 1.2, 1.3, 5.1). Concrete blockhouse (A.4) Security grilles of Ennis Rd occupancy used as tollhouse (A.4) 	 Recent alterations to occupancies (1.1, 1.2, 1.3, 5.1, 5.2). Wearing surfaces of road, rail, foot and cycle ways (1.1, 5.1). Road gantries and signage (A.4). Movable medians (A.4) Computers, control equipment, realy switchgear (A.4) Flood lighting (A.1). Ennis Road awnings and grilles over first floor windows (1.3). Modern tiling on walls of subway and cement patching of stairs (A.6). Cycleway ramp conversion of bridge stairs (A.6). In-line cycleway ramp from Observatory Hill Park (A.6). 	 Face-fixed services, airconditioners (1.2, 1.3, 1.4, 5.2). Aluminium windows (1.2, 1.3, 5.2). Advertising on surfaces of original render (1.2, 1.3). Paint finishes, graffiti, cement washes (A.6, A.9, 1.1, 1.2, 5.1, 5.2). Plant growth, dirt, water staining and lime deposits (1.1, 5.1, 5.2). Pay parking machines in Burton Street arch (1.4). Light in Burton Street arch (1.4). Security fences added to secure areas including four main arch bearings, along the south-east footway under Cahill Expressway next to tram tunnels (3.2) Creepers, wire trellises, modern light poles, conduits and fittings attached to Hickson Road retaining wall (4.2). Brick sheds next to Hickson Road retaining wall (4.2). Security cameras (A.6, 5.3). Wide window & external services of toll house (A.4) Excessive signage, advertising and noticeboard at north-western stairs (A.6). Blue painted handrails in stairwells (A.6). Security door (5.20)
 Original electrical equipment in switch house (subject to contamination study) (5.4). The ladder to Argyle Cut (5.4). Stone blocks, vestiges of buildings in the northern yard on the eastern boundary (5.4). 	 Modern converters, transformers, compressor, cables, fluorescent lighting and batteries (5.4). The security grille outside the cycleway door (5.4). 	 External substation equipment (5.4). Security fences around the substation and yard (3.2). Security grilles on windows (5.4). Glass that does not match the original types (5.4). Sheds along the western edge of the substation curtilage fronting onto Trinity Avenue (5.4).
 Evidence of riveted steel I-beam columns and other associated features. 		

	Grading	
Bridge Component	High (H)	
Milsons Point Station (Precinct 1)	 Fabric dating from the original construction period (1.5) Structure, original finishes and awnings of Milsons Point station (1.3, 1.5). Date crest over both entrances to station (1.1, 1.3, 1.5). Rendered architectural elements (1.5). Vestiges of tram station (e.g. stairs) (1.5). Brackets and light fittings to Ennis Road and Alfred Street entrances (A.1, 1.5). Walls, floors, and roof structures of the subway, platform and associated structures (1.5). Stone surround to Alfred St entrance (1.5). Wall tiling (1.5). Clock mounting boards (minus clocks) (1.5). Overhead cable gantries and stanchions (1.5). 	
Bradfield Park (Precinct 2)	• Bronze plaques along approach spans within the park (2.1, A.5).	

Figure 4.13 Photograph of iron workers who worked in the SHB in 1932.



(Source: Mitchell Library)

Moderate (M)	Little (L)	Intrusive (I)
	 Railway tracks (A.2, 1.5). Concrete sleepers (A.2, 1.5). Timber transoms (A.2,1.5). Overhead power cables (1.5). Signalling equipment (1.5). Platform landscaping and lighting (1.5). 	 Lift (1.5) Stainless steel bins at Ennis Road entrance (1.5). Glass panels at Arthur Street entrance (1.5). Drycleaner at entrance to station (1.5).
 Vestiges of the kerbing which edged Willoughby Street in Bradfield Park North (2.1). The sunken garden and fountain in Bradfield Park North (2.1). Archaeological remains of early houses and other structures (2.1). Two stone shelters housing floodlights (2.1). The HMAS Sydney memorial (2.1). 		



5. Curtilage assessment

5.1 Introduction

The SHB crosses Sydney Harbour between Dawes Point in the south and Milsons Point in the north. It is listed as a heritage item on a number of statutory heritage registers (see Sections 1.3.1 and 6.9), namely the Commonwealth Department of Agriculture, Water and the Environment; Heritage NSW, Department of Premier and Cabinet (the SHB in its entirety); the City of Sydney Council (southern approaches); North Sydney Council (northern approaches and approach spans); and Property NSW (southern approach spans).

This updated CMP proposes a curtilage that is consistent with that of the State Heritage Register (SHR) listing for the SHB (see Figure 1.3). It also addresses the issue of an appropriate buffer zone to protect the cultural values of the SHB within its harbour and city setting. The objective of the buffer zone is to establish a visual curtilage around the SHB, within which inappropriate development would have the potential to affect these values.

5.2 Management curtilage

The 1998 CMP considered the SHB as a number of distinct elements which collectively constitute the SHB in its generally recognised extent. These elements are:

- The arch, deck and associated steel structure
- The granite-clad reinforced concrete
 pylons
- The steel approach spans which are supported on granite-clad reinforced concrete piers, and (on the south side) a number of sandstone and concrete stairs, handrails and balustrades
- The cement rendered reinforced concrete approaches, including tunnels, tenancy spaces (on the south side),

substation and (on the north side) Milsons Point railway station.

The 1998 CMP divided the SHB into five precincts (attached in Appendix B) based on the breakdown of elements discussed above. This approach facilitates cross referencing to the updated Inventory Records document that contains specific conservation policies and basic guidelines for maintenance and minor repairs to the SHB. These precincts are:

- Precinct 1 Northern approaches, Middlemiss Street occupancies, Ennis Road occupancies, Arthur, Burton, Fitzroy and Lavender Street Arches, and Milsons Point Train Station
- Precinct 2 Northern approach spans and pylon, located in Bradfield Park
- Precinct 3 Main arch structure. Fences, stairs and catwalks, cranes and gantries and communication equipment and beacons.
- Precinct 4 Southern approach spans and pylon, located in Dawes Point Park and King George V Memorial Park, plus sandstone and concrete stairs, handrails and balustrades and Hickson Road retaining wall.
- Precinct 5 Southern approaches including tenancy spaces., arched viaduct in Cumberland Street, Argyle Street Arch and Argyle Street substation.

In the period since the adoption of the 1998 CMP, the precinct based approach to conservation policy implementation (including maintenance and minor repairs), set out in the Inventory Records document, has proved effective and achieved broad acceptance by Transport for NSW personnel responsible for the ongoing care and management of the SHB. It is proposed that the precinct based structure contained in the 1997 Sydney Harbour Bridge Inventory Records be retained, and that this continue to provide the basis for the ongoing care and management of the SHB along with the SHB Asset Register.

5.3 Statutory curtilage

The SHR and NHL curtilages are identical, except that the SHR curtilage also includes the northern approaches between Lavender Street and Arthur Street.

5.3.1 National Heritage List

The 'Sydney Harbour Bridge, Approaches and Viaducts' was listed on the National Heritage List (NHL) in March 2007. Under the EPBC Act, any action which would be likely to have a significant impact on the National Heritage values of a place listed on the NHL (as a 'controlled action') requires approval of the Commonwealth Minister.

As part of the listing process, a map was prepared which forms part of the NHL documentation and establishes a curtilage for the jurisdiction of the provisions of the EPBC Act (Figure 1.4). The boundary of the NHL curtilage includes land that is not in the ownership of the New South Wales Government, particularly Bradfield Park which is owned and managed by North Sydney Council. The NHL database entry and curtilage map for the SHB is attached in Appendix A.

5.3.2 State Heritage Register

The 'Sydney Harbour Bridge, approaches and viaducts (road and rail)' was placed on the State Heritage Register (SHR) in 1999 (gazetted 25 June), as was 'Milsons Point Railway Station group', which includes the area bounded by the SHB approach structure and reserves surrounding it from the Burton Street underbridge to the Lavender Street underbridge (gazetted 2 April) (Figure 1.3).

5.3.3 Sydney Opera House

The Sydney Opera House (SOH) was inscribed on the World Heritage List (WHL) in 2007 having previously been inscribed on the NHL in July 2005. The EPBC Act provides a framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places—defined in the EPBC Act as matters of 'National Environmental Significance' (NES). National Heritage places are matters of NES under the EPBC Act.

The SOH buffer zone centres on the nearby waters of Sydney Harbour (Figure 1.5). It includes places around Sydney Harbour within a radius of 2.5 kilometres that have been identified as offering critical views to and from the SOH that contribute to its World Heritage significance. The SOH buffer zone includes the SHB in its entirety.

The SHR curtilage for the SOH is identified in red in Figure 1.5. It is fully contained within the NHL buffer zone for the SOH. There is no overlap of the SHR curtilages for the SHB and the SOH.

The Sydney Opera House Management Plan 2017 sets out the statutory framework for the property and is part of a bi-lateral Federal/State agreement which defines its statutory assessment and approval processes, and is accredited under Section 46 of the EPBC Act.

The Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 was amended in 2007 to establish a buffer zone around the SOH so as to give added protection to its World Heritage value, and to recognise that views and vistas between the SOH and other public places within that zone contribute to its World Heritage value. Section 58(B) of the Sydney Regional Environmental Plan 2005 requires that development avoid any diminution of the visual prominence of the SOH when viewed from other public places within the buffer zone.

Thus, the visual setting of the SOH is managed, in planning terms, by the delineation of a buffer zone within which all development must be considered for its impacts on the significance of the SOH; to conserve views and vistas between the building and other public places within that zone; and to preserve the World Heritage value of the SOH.

In summary, and relevant to the SHB, any future development must avoid any diminution of the visual prominence of the SOH when viewed from public places in the buffer zone.

5.4 CMP curtilage

The CMP curtilage map is shown in Figure 5.1. It includes the entire heritage curtilage of the bridge as defined by its SHR listing. As discussed in Section 5.3, the NHL curtilage does not include the northern approaches between Lavender Street and Arthur Street, Lavender Bay and as such, is wholly contained within the SHR curtilage. The CMP curtilage includes two additional portions of land not included in the above statutory listings. These are:

- The Toll House at the southern extent of the curtilage
- The central section of Bradfield Park just south of the Milsons Point station entrance.

5.5 CMP setting

The SHB in its setting is one of the most internationally recognised views of Australia and the city of Sydney. The setting includes other iconic elements such as the SOH, the city skyline, the harbour and its foreshores. The steel arched form, Art Deco inspired granite pylons and composite approach spans create an iconic and dramatic composition that consistently evokes a positive response from observers.

Views of the SHB, because of its scale and pivotal location across a narrow section of Sydney Harbour adjacent to the most intensively developed area of Sydney, are available from many key points around the harbour and its hinterland. The protection of these views is an essential component of the overall strategy for conserving the cultural values of the SHB. Inappropriate development within this setting, dependent upon the type and location of the development, has the potential to affect these values.

5.5.1 Implications of Sydney Regional Environmental Plan 2005 on SHB views

Listing the SHB on the SHR and the NHL provides statutory protection for the SHB and its component parts. In terms of NSW planning laws, the main instrument for the protection of the SHB setting is the Sydney Regional Environmental Plan 2005. The 'Sydney Harbour Bridge, approaches and viaducts (road and rail)' is listed as a heritage item on the Sydney Regional Environmental Plan 2005 (Item 67), and the provisions of the Sydney Regional Environmental Plan 2005 therefore apply to the bridge. In particular, Division 2 of the REP requires that the '...matters to be taken into consideration in relation to the maintenance, protection and enhancement of views are as follows: ... (b) development should minimize any adverse impacts on views and vistas to and from public spaces, landmarks and heritage items ...' (Cl.26(b)).

The Sydney Regional Environmental Plan 2005 curtilage extends from the entrance to Sydney Harbour in the east to Parramatta in the west, and includes land that varies in its distance from the harbour shoreline. Notwithstanding the extent of locations around the harbour and its hinterland from which views of the bridge are possible, the setting map attached in Figure 5.2 outlines that section within the Sydney Regional Environmental Plan 2005 curtilage within which inappropriate development could impact upon the cultural values of the bridge in its setting, and where the provisions of the Sydney Regional Environmental Plan 2005 that apply to 'impacts on views and vistas to and from ... heritage items' would be rigorously applied.

Figure 5.1 SHB CMP curtilage map.



State Heritage Register (SHR) curtilage (on land)

- ••••• SHR curtilage (over water)
- Additional curtilage area not included in the SHR and NHL •••••

(Source: Adapted from the Sydney Harbour Bridge, approaches and viaducts, National Heritage List. Department of Agriculture, Water and the Environment)

Figure 5.2 SHB Setting Map.



(Source: Adapted from the Sydney Regional Environmental Plan Foreshores and Waterways Area Map, Sheet 3 of 5. Department of Planning, Industry and Environment)

5.5.2 Discussion of key views

The location and size of the SHB means that it is a visually dominant feature of the Sydney landscape. Extensive opportunities exist to view the bridge both up close and from a distance.

While the bridge can be viewed from multiple vantage points, the eastern face is considered to offer the primary views both to and from the bridge. Some of the reasons for this are as follows:

 The eastern face of the bridge faces out toward the city and the open harbour, and it is often shown as the backdrop to the city in news reports, tourism and promotional materials, as well as public events. Figure 5.3 View to the north-west from the pedestrian look-out on the Cahill Expressway.



(Source: GML 2013)

Figure 5.4 The view from Mrs Macquaries Point is popular with tourists. SHB and Sydney Opera House viewed to the west.



(Source: GML 2013)

Figure 5.5 View of the eastern face of the SHB taken from the Sydney Opera House.



(Source: GML 2013)

• The eastern face of the bridge has an important visual and spatial relationship with the Sydney Opera House, and together they help define the iconic character of Sydney as a harbour city.

Figure 5.6 View to the SHB along George Street, The Rocks.



(Source: GML 2013)

- In terms of public celebrations, the eastern side of the bridge has primary importance. For example, the key elements of the 'Sydney New Year's Eve Welcome to Country, 9pm Family and Midnight Fireworks Displays and Bridge Effects' are displayed on the eastern face. The eastern faces of the pylons, particularly the southern pylon, are used to display banners and projections which promote values and messages of importance to the people of NSW.
- In terms of views from the bridge, pedestrian access is only available from the eastern side of the bridge. Views to the city and east along the harbour are available from the South Bridge Stairs viewing area, the length of the footway on the bridge, and from the viewing platform in the southern pylon. Pedestrian access is not available on the western cycleway, and it is hazardous for cyclists to stop along the cycleway to take in the views due to fast-moving bicycle traffic.
- Despite the prominence of the eastern face of the bridge, significant views to the bridge are available from many different locations. Consent authorities and proponents would need to consider impacts on significant views to and from SHB views when preparing and assessing development proposals (see Section 5.5.1). This CMP identifies a number of

different view 'types' within the inner harbour to assist in this task.

• These types, which are all publicly accessible, are described below and shown in Figure 5.12.

a) Foreshore vantage points

The Sydney Harbour foreshore includes a number of publicly accessible locations that offer attractive and uninterrupted views to the SHB and to Sydney Harbour generally.

These locations are enjoyed year round by both local residents and tourists, but especially during major public celebrations where the SHB is the central focus. This includes celebrations such as New Year's Eve and Australia Day. A sample of these locations is listed in Table 5.1.

b) Detailed views of the SHB

Bradfield Park and Dawes Point (Tarra) Park not only offer people up close and uninterrupted views of the SHB, but they also allow people to better appreciate its technical and aesthetic details. From both Dawes Point (Tar-ra) Park and Bradfield Park, people are able to walk under the southern and northern approach spans respectively and gain an appreciation of the various steel components of the SHB and how the structure has been created. The exterior faces of both pylons and the approach span piers can be closely inspected from these locations.

c) Iconic tourist views of the SHB

As discussed in Section 3.3, the SHB is recognised as having important iconic value at both a national and international level. Over time, certain views of the SHB have become more popular than others for their ability to show the bridge as a key landscape feature or to capture multiple tourist elements within a single vista, particularly including the SOH. As discussed above, the eastern face of the SHB is considered to have primary significance, although other vistas have recognised value.

Examples of iconic tourist views that are publicly accessible include, but are not limited to:

- View from Milsons Point (including Luna Park, SHB and SOH)
- View from the Cahill Expressway (including Circular Quay, Milsons Point, SHB and The Rocks)
- View from SOH (including Luna Park, Milsons Point and SHB)
- View from Observatory Hill (including Millers Point, Milsons Point and SHB).
- View from Bradfield Park (including Circular Quay, City of Sydney skyline, SHB and SOH)
- View from Mrs Macquaries Point and the Botanical Gardens (including SHB, SOH and the city).

Balls Head Reserve, Balls Head	Cremorne Reserve, Cremorne Point	Observatory Hill	
Blues Point Reserve, Blues Point	Dawes Point (Tar-ra) Park, Dawes Point.	The Rocks (various locations, but particularly Cumberland	
Bradfield Park , Milsons Point	Fort Denison	and Hickson Road	
Circular Quay and the Cahill Expressway	Goat Island (limited access)	The Sydney Opera House, Bennelong Point	
Clark Park, Lavender Bay	Mrs Macquaries Point	Yurulbin Park, Birchgrove	

Table 5.1: Sample of key foreshore vantage points of the SHB

d) Views from the SHB

The SHB affords the public with primary views of Sydney Harbour and its foreshores from its eastern side. This allows for uninterrupted viewing of the harbour towards The Heads, Kirribilli Point, Fort Denison, SOH, Circular Quay, The Rocks and the Sydney skyline. The primary viewing points are:

- The eastern pedestrian walkway
- The observation deck from the top of the southern pylon (entry fee charged)
- The southern Bridge Stairs.
- The guided climbs operated by the SHB Concessionaire – This has an associated fee and has some accessibility limitations.

Please note that the views described above are not exhaustive, but have been developed to assist developers and councils to identify whether significant views are likely to be affected by a proposal. Where there is likelihood that significant views would be affected, it is recommended that a visual impact assessment be prepared to inform the design.

Figure 5.7 View to the north-east from Observatory Hill.



(Source: GML 2013)

Figure 5.8 View to the south-west from Bradfield Park.



(Source: GML 2013)

Figure 5.9 View to the south-east from near the entrance of Luna Park.



(Source: GML 2013)

Figure 5.10 View to the east from deck level of the south-east pylon.



(Source: GML 2013)



Figure 5.11: Sample of key locations offering views of the SHB.

Transport for NSW

6. Constraints and opportunities

6.1 Introduction

The National and State Heritage values of the SHB described in Section 4.0 result in constraints and opportunities that may apply to the future use and management of the SHB, and must be taken into account in its ongoing conservation and maintenance.

The following sections outline the principal heritage constraints and opportunities which may arise from relevant state and local legislation, as well as the Environmental Planning and Assessment Act 1979 (EPBC Act). Other constraints and opportunities resulting from legislative compliance are also briefly outlined. Potential constraints and opportunities will arise from the following:

- Heritage values/significance
- Ownership
- Commercial tenancies
- Security, safety and access
- Operational requirements
- Physical condition and maintenance
- Statutory requirements
- Interpretation.

6.2 Constraints and opportunities arising from significance

6.2.1 General discussion

The establishment of requirements for the retention of the heritage significance of the SHB is the first step in the development of conservation policies. These requirements are based on the aspects of significance identified in the Statement of Significance set out in Section 4.0 of this CMP, as well as the more detailed assessments set out in the various heritage listing forms and citations included in Appendix A.

The future conservation, development and ongoing management of the SHB should take into account constraints arising from the identified heritage values of the site and its setting. Opportunities to retain, reinstate and interpret these heritage values should also be investigated and implemented, particularly where they can be integrated into the daily use and ongoing care of the place. Other obligations that arise from the assessed heritage values of the place are:

- The physical evidence of the SHB, including its current setting, should be retained and conserved
- The many historical associations of the place—with people, processes and events—should be maintained and able to be interpreted
- Archaeological resources, both above and below ground, and collections of artefacts and records should be protected and conserved
- Records and other information, such as oral histories and personal reminiscences, should be recognised as important elements of the SHB and appropriately maintained and managed.
- Interested persons and organisations, such as the families of former workers involved in building the SHB and local residents, should be encouraged to be involved in the care and conservation of the place.
- The history and significance of the SHB should be interpreted to visitors and communicated to the wider community.

6.2.2 Conservation principles

Protection of the heritage significance of the place should accord with the principles of The Burra Charter: The Australia ICOMOS Charter for the Places of Cultural Significance 2013 (the Burra Charter). The Burra Charter provides specific guidelines for physical and procedural actions that should occur in relation to significant places. The Burra Charter is provided in full in Appendix B; however, particular measures relevant to the place include:

The maximum amount of significant fabric, uses, associations and meanings should be preserved and conserved. (Refer to Article 3, the Burra Charter)

Works to the fabric should be planned and implemented taking into account the relative significance of the elements of the place. Unavoidable intervention should be carried out on elements of lesser significance in preference to those of higher significance. Alterations to interior spaces, such as removal of original finishes, partitioning or construction of new openings and installation of new services should be carried out in spaces of lesser significance to those of higher significance. (Refer to Article 5.2, the Burra Charter)

Uses should, if possible, be related to the cultural significance rather than uses that do not take advantage of the interpretative potential of the place. (Refer to Article 7, the Burra Charter)

The proponent should engage an experienced conservation practitioner and consult this CMP at an early stage in any proposal that has the potential to result in a heritage impact. In this way, the heritage constraints and opportunities can be addressed from the outset and an appropriate approach developed that is consistent with the policies set out in Section 7 of this CMP, and the Burra Charter methodology. The conservation practitioner should continue to provide advice throughout the project and the extent of intervention for existing site components, fabric, and visual and functional relationships should be minimized and related to the assessed level of significance, as set out in Section 4.6.

6.3 Ownership

6.3.1 Transport for NSW

Ownership of the SHB and approaches is vested with Transport for NSW¹, with the

exception of the area of land under the control of the Property NSW (addressed in Section 6.3.2) and Bradfield Park which is owned and managed by North Sydney Council. Although Transport for NSW Greater Sydney Division is the nominal manager of the SHB, responsibilities for major bridge operations are divided between various divisions of Transport for NSW and Sydney Trains. These include:

- Sydney Trains—the railway system (two tracks) across the SHB and old tram tunnel and the south approach electrical substation building. Sydney Trains is the lessee of Milsons Point Railway Station.
- Transport for NSW Safety Environment and Regulation Division—care of the SHB as an item of environmental heritage
- Transport for NSW Corporate Services Division—all the leased occupancies below the approaches to the SHB; that is, the front and rear walls and internal subdivisions, but not the internal fitout
- Sydney Trains Civil Maintenance Staff (Maintenance) are responsible for the day-to-day upkeep and management of rail property
- Transport for NSW's corporate commitment to environmental heritage is embodied in its policy for the management of heritage items as stated in Transport for NSW's Heritage Guidelines.

A management position responsible for the SHB as a whole has been established between Transport for NSW and Sydney Trains, with overall responsibility for all work affecting the SHB, however minor. As has been the case historically, a variety of proposals for change will continue to emanate from different stakeholders (both within Transport for NSW and from other sources), but a single manager or management unit will coordinate and implement the correct procedure to be followed in each case.

^{1.} Transport Administration Act 1988, paragraph 183, Schedule 7.

6.3.2 Property NSW

The Sydney Harbour Foreshore Authority (SHFA) was one of the biggest landholders in Sydney and managed over 400 hectares of public land, including the major precincts of The Rocks and Darling Harbour, as well as foreshore sites in Pyrmont and Ultimo, Rozelle and Ballast Point.

In September 2015, SHFA was amalgamated with Government Property NSW, and formed Property NSW which was part of the Department of Finance, Services and Innovation. The agency manages the State's significant property portfolio and its places, which results in better visitor experiences and services for the people of NSW.² On 1 July 2019, Property NSW transitioned to the Housing and Property Group within the Department of Planning, Industry and Environment.3

With regard to the SHB, Property NSW now controls all the publicly owned land surrounding the Bradfield Highway and Western Distributor on the southern side of the harbour, including the Dawes Point Battery archaeological remains on Hickson Road, The Rocks, which are listed on the State Heritage Register (SHI No. 01543). The heritage listings for the Dawes Point Battery site are provided in Appendix A. Property NSW is also responsible for a narrow parcel of land known as King George V Memorial Park on Cumberland Street, The Rocks; however, it is owned by the City of Sydney.

As the custodian of The Rocks, Property NSW is required to maintain and conserve existing and potential archaeological sites, landscapes, buildings and movable heritage in their landholdings, and to oversee the following aims:

- The development and maintenance of the precinct for a sustainable future
- Urban design, retail mix and customer relationship with all retail, commercial and residential tenants

- Preservation of its heritage buildings
- Creation and development of its events
- Marketing •
- Management of its operation and capital costs and revenues.4

The conservation policies in this CMP take into account the aims of Property NSW in regard to its landholdings and responsibilities to land that falls within the curtilage of the SHB.

6.3.3 North Sydney Council

North Sydney Council controls Bradfield Park, which is within the curtilage of the SHB, and much of the publicly owned land adjacent to the SHB north of the harbour. The council is also the consent authority for development on the adjacent publicly owned land, subject to the provisions of the North Sydney LEP 2013, DCP 2013 and other planning policies.

6.3.4 City of Sydney

City of Sydney Council is the consent authority for development within the Sydney LGA, and includes development in the vicinity of the SHB. The provisions in Section 5.10 of the Sydney LEP 2012 require a heritage assessment to be prepared for any proposed development that may affect the heritage significance of a heritage item or heritage conservation area.

6.3.5 Section 170 obligations

Section 170 of the Heritage Act 1977 (NSW) requires government instrumentalities to establish and keep a register of each item of environmental heritage under their ownership, occupation or control.

A number of items related to the SHB are included in the Section 170 Heritage and Conservation Registers of Transport for NSW and Sydney Trains (these items are listed in Section 1.3 and Appendix A).

NSW Government, Finance, Services & Innovation, Property NSW, viewed 17 January 2018, https://www.finance.nsw.gov.au/property-nsw/, NSW Government, Property NSW, viewed 9 March 2020, https://www.property.nsw.gov.au/about-us)

ibid

6.4 Commercial tenancies

Although the southeast pylon tower was once leased and operated as a shop, post office and café; it is currently operated as the Pylon Lookout (which incorporates the SHB Museum), managed by the SHB Concessionaire, and is the only publicly accessible pylon. The other areas of the SHB currently being leased by Transport for NSW for commercial uses include:

- The ten bays in Middlemiss Street
- Bays 12-14 and 16-18 of Ennis Road
- Four shops on the pedestrian concourse of Milsons Point Railway Station (owned by Transport for NSW and managed by Sydney Trains)
- All the bays in the southern approaches
- Five licenses to telecommunication carriers for installation on the SHB.

Consideration of new (commercial or noncommercial) uses for the tenancy spaces available within the SHB should include public engagement with the cultural heritage values of the SHB as a requirement for use of the space. New uses must not impact on either the integrity of its original design or significant fabric, or its operational and security requirements. Guidelines, policies and procedures are also required to control the extent of change allowed to tenancies and to determine whether certain changes can be exempt from the approval process.

Situated under the approaches, the bays are leased to shops, offices and workshops. The commercial tenants who occupy the various bays leased by Transport for NSW are responsible for the maintenance of the spaces they lease. Maintenance and capital works responsibilities need to be clearly established between Transport for NSW and tenants, so that adequate ongoing maintenance and repair is undertaken. It would be appropriate that Transport for NSW monitor the condition of the bays and contribute to ongoing repairs to the basic structure of the arches and external front and rear glazed walls as required, in order to maintain the general condition of the bays as important components of the SHB overall.

Figure 6.1 North approach tenancies on Pacific Highway, North Sydney.



(Source: Transport for NSW)

Figure 6.2 BridgeClimb Sydney tenancy in southern approach bays.



(Source: Transport for NSW)

The former Blue Street car park, located at the northernmost extent of the bridge's curtilage at North Sydney is no longer used as a publicly accessible car park. It is used instead by Transport for NSW and Sydney Trains as a storage and parking area

6.5 Security, safety and access

The SHB is an access corridor shared by road and rail users, pedestrians and cyclists, all in relatively close proximity. Other users of the SHB include tourists, employees of the Pylon Lookout, the SHB Concessionaire, Sydney Trains, Transport for NSW, and other maintenance personnel.

Providing appropriate and safe access for all these users is central to the function of the

SHB. With more rigorous safety standards and increasing security concerns, suitable policies and procedures are required to ensure that the conservation of the heritage values of the SHB are balanced with the need for the SHB to evolve with the changing legislative environment.

Specific requirements and issues associated with security, access and safety are discussed below.

6.5.1 Security requirements

The increasing security concerns that prevail at any major public asset such as the SHB require that additional measures be put in place to ensure the security of both the SHB itself and its users. In 2006, work was undertaken by the then RTA and RailCorp to upgrade security on the cycleway on the western side of the SHB. The project included the installation of full height fencing from Milsons Point Station to the Argyle portal and emergency exits at a spacing of 90 metres along the rail corridor.⁵ The fencing was required to deter unauthorised access to the roadway, railway and bridge steelwork, and the emergency exits were required for the safe exit of workers and passengers in the event of an emergency in the rail corridor. Subsequent to this, safety fencing was also erected on the eastern side of the SHB along the pedestrian walkway.

Further security upgrades are being carried out on an ongoing basis as part of the continuing operation of the SHB. The management of the SHB must reflect the provision of security as integral to the protection of the users of the SHB, the SHB as an asset, and the cultural heritage values of the SHB.

Transport for NSW must ensure that the adequacy of the security arrangements is assessed on a regular basis.

It is also necessary that information about the design, discussion and implementation of some security procedures and installations for the SHB is not placed in the public domain. Consideration of the heritage impacts of proposed security measures on the SHB must be undertaken in a confidential manner as an open process could increase the risk to the SHB and its users.

The conservation policies should adequately reflect these requirements and include provisions for employee and visitor access to vital areas of the SHB, as required.

6.5.2 Access requirements

Pedestrians crossing the SHB do so via the designated walkway on the eastern side of the SHB, and cyclists use the cycleway on the western side. While the separation provides a solution to the safety issues associated with the sharing of walkways by both cyclists and pedestrians, it limits opportunities to view and appreciate the harbour from both vantage points. Despite this limitation, Transport for NSW is unlikely to return to a shared pedestrian and cyclist pathway, as the benefit does not outweigh the risk to safety.

The connections to the approaches and the SHB facilities need to be more clearly defined. Opportunities to improve directional and information signage along the walkway and cycleway, as well as the areas immediately adjacent to the SHB, should be investigated.

In October 2018, pedestrian lifts were installed at Cumberland Street, The Rocks and Broughton Street, Kirribilli providing step-free access to the eastern walkway.

The NSW Long Term Transport Master Plan (December 2012) by Transport for NSW outlines a vision for improved cycleways throughout Sydney. By 2016, the plan aims to double the number of bicycle trips in metropolitan Sydney, with further growth in cycling for all trips in NSW by 2031, particularly in urban centres.

Transport for NSW and North Sydney Council have explored a number of options to improve the efficiency and safety of

5. NSW Roads and Traffic Authority, 'Upgrade to security on the rail corridor and cycle path', SHB cycleway, Community Update, December 2005.

cycleways in North Sydney, including access to and from the SHB. Currently, there is no continuous cycleway or shared path connecting the North Shore cycleway between Merrenburn Avenue, Narremburn, and the SHB. Also, cyclists are currently required to dismount their bike at the northern bridge stairs and use the steps. A central ramp on the stairway allows cyclists to wheel their bikes up or down the steps.

In mid-2006, as part of requirements to upgrade security and safety, the cycleway on the SHB was narrowed to a width of 2.5 metres. Works undertaken for increased safety, security and access need to be considered together within the same context, and solutions developed comprehensively. All options for improving cycleway efficiency and safety must address the likely physical and visual impacts on the heritage significance of the SHB and its curtilage.

6.5.3 Safety

The safety of workers and users of the SHB needs to be ensured at all times. With more stringent safety requirements, changes and upgrades will be required which have the potential to diminish the integrity of the SHB. For example, an integral part of the original SHB fabric is the original access equipment provided for bridge maintenance, including the cranes, gantries and ladders. While important examples of 1930s engineering technology; despite modifications, some of the equipment either fails to comply with modern work practices or is difficult to use efficiently. In 1997, four new arch cranes were commissioned, and a new access lift was installed, leaving much of the equipment redundant. In 2008, approval was given for the replacement of the original under-deck maintenance gantry, and upgrades to other maintenance structures (including catwalks) for safety reasons.

Therefore, policies to manage the commissioning of new equipment and determine what redundant equipment can be removed are required. The policies will also need to address what historically significant equipment would need to be conserved as vital components of the SHB's fabric.

Figure 6.3 View of the main span gantry adjacent to the walkway on the eastern side of the SHB.



(Source: Roads and Maritime 2007)

Figure 6.4 View of the lane status gantry built in the 1990s.



(Source: Transport for NSW)

Figure 6.5 View of security fencing used on the walkway on the eastern side of the SHB.



(Source: Transport for NSW)

In all cases, the form and fabric of alterations and additions should be carefully selected and be of a similar design to those functional devices already on the SHB in order to minimise adverse effects upon the overall significance of the SHB.

6.6 Operational requirements

Subject to State and Commonwealth legislation governing areas such as motor traffic and transport, heritage and telecommunications; a number of operational constraints arise from Transport for NSW' role of keeping the road system across the SHB operating efficiently. Activities which form the basis of traffic and transport management include the:

- Provision and operation of movable medians
- Provision and replacement of overhead lane indicators and lights
- Pavement marking and general sign posting
- Collection of automated and manual traffic data
- Identification of special purpose lanes, such as the existing bus lane
- Installation and maintenance of Intelligent Transport Systems (ITS), Closed Circuit Television (CCTV) and Variable Message Signs (VMS)
- Tow truck and patrol operations.

Apart from the SHB's structural function in supporting transport systems, the fabric directly affected by the operational requirements listed above is mainly confined to deck level elements such as signage and toll collection. As these elements tend to be upgraded regularly, they have potential implications for the heritage values of the SHB where those works affect the overall form of the structure, or where it involves changes to those parts of the fabric listed as having a certain degree of significance.

Current activities that need to be maintained (and to some extent enhanced) on the

SHB that do not relate to vehicular traffic management include:

- Licence arrangements with telecommunication companies with antennae and cable facilities on the SHB
- Use of radio antennae to monitor security on Sydney Ferries
- Use of the northern pylon to house the ventilation stacks for the Sydney Harbour Tunnel
- Use of the pedestrian walkway and cycle paths. In regard to the cycle path in particular, there is pressure to provide upgraded access at each end of the SHB to accommodate increasing numbers of cyclists using the cycle path.
- Use of the SHB by Sydney Trains, who maintains the railway system. This includes Milsons Point Railway Station, and requirements specifically associated with signage, access and customer service facilities
- Use of the SHB for local and national celebrations.

Figure 6.6 View of additional walkways constructed as part of SHB access for theSHB Concessionaire's guided climbs.



(Source: Transport for NSW)



Figure 6.7 View of the original system of collecting tolls.

(Source: Mitchell Library- Home and Away 5251)

Figure 6.8 View looking south of the former southern automatic toll booths.



(Source: Roads and Maritime 2012)

Figure 6.9 View of pedestrian plaza area beneath the northern approach span of the SHB at Bradfield Park.



(Source: Transport for NSW)

6.6.1 Transport changes

Since 1932, there have been some significant alterations to the traffic lanes, toll collection and traffic control on the SHB deck in response to increases in, and measures to accommodate, traffic volume; for example, the replacement of the tramways in 1958 and the creation of bus lanes in 1972. The approaches have also been significantly modified by the connection with the Cahill Expressway in 1958, the Warringah Expressway in 1968 and the Western Distributor in 1972. Sydney Trains and Transport for NSW, as part of their operations and with new technologies, will continue to expand, upgrade and enhance infrastructure, which may impact upon the significance of the SHB. Any changes associated with transport to and from the SHB should be guided by the conservation policies set out in Section 7 of this CMP.

6.6.2 Change of use

Similar procedures should be developed to deal with proposals to introduce new uses onto the SHB. As stated in the 1998 CMP: 'any such scheme should be examined not only in terms of its impact upon the SHB's significance but also for its compatibility with the use of the place.'⁶ Examples of existing compatible uses include the introduction of a museum about the SHB in the southeast

6. ibid

pylon tower, and the introduction of guided climbs by the SHB Concessionaire in 1998, which allows for small escorted groups clipped to a safety cable to climb the SHB. Minor alterations were made to the SHB to allow for this later use, including an opening in the southeast pylon tower, the construction of additional walkways and the installation of safety cables.

Clear policies that relate to the assessed level of significance set out in Section 4.6 are required to define the SHB's tolerance for change. In all cases of change, the policy implementation process should take into consideration the original design of the SHB as well as the impact upon significant fabric.

6.6.3 Signs and other accretions

Policies and guidelines will need to be formulated to ensure that signs and other accretions do not adversely impact upon the heritage values of the SHB. In addition to the potential to diminish the aesthetic significance of the SHB, additions to the SHB fabric, whether to the masonry or steelwork, could cause physical damage through their fixings, etc. Attention should also be given to the possible accumulative impacts of changes to the aesthetics of the SHB.

The SHB is already used as a support for items such as mobile phone aerials, telecommunications cables and other services. Under the EP&A Act, Transport for NSW has a process in place to assess the potential heritage impact of proposed works prior to implementation. The heritage impact of any further fixing of permanent to semi-permanent equipment to the SHB will also need to be considered as part of the process.

The use of the SHB for commercial advertising signage or other installations is not fundamental to its function or heritage significance. A policy approach that prohibits commercial advertising on the SHB is warranted.

6.6.4 Fireworks and events

The SHB has been an important part of Sydney's New Year's Eve celebrations, with images of the lit-up 'Bridge Effect' sent around the world, reaching more than one billion people and honouring JJC Bradfield's vision of lighting up the SHB. Thousands of people now travel from around the globe to see the famous SHB featuring in the New Year's Eve celebrations.

The SHB also acts as a stage for the 9pm Family Fireworks and Midnight Fireworks display; while the faces of the north and south pylons are brought to life through light projections related to the New Year's Eve theme, sponsor acknowledgement and the provision of community service announcements.

When the clock strikes midnight, all eyes are on the SHB, reminding people of how important this structure is to the character of Sydney, the movement of its people and its history.

Policy 21 and Specific Exemption 15 provide for the ongoing use of the 9pm Family Fireworks and Midnight Fireworks Display, the Bridge Effect and the pylon projections, in an appropriate and acceptable manner.

In addition, the SHB has been used for a variety of events over the years, such as the 'Walk for Reconciliation' and the bridge walk to mark the 75th anniversary of the SHB. The SHB pylons have also been used to display banners and projections in support of a range of charitable and social events.

Policy 22 has been developed to ensure that the integrity of the SHB is conserved and that such events continue to be seen as special. The policy aims to ensure that the SHB is not subject to the overuse of displays and events.

6.7 Physical condition

6.7.1 Maintenance requirements

As described in the 1998 CMP:

... compared with modern engineering practice, the bridge is a high maintenance structure composed of many thousands of individual steel sections connected by means of millions of rivets. In the marine environment of Sydney Harbour it must be recognised that the inspection and maintenance of such a structure will always be a demanding and labourintensive operation.⁷

Transport for NSW has an established comprehensive maintenance program which addresses general bridge maintenance requirements such as painting, road maintenance and the protection of the steelwork from corrosion, etc. The program also incorporates constant inspection and the involvement of a variety of tradespeople including ironworkers, boilermakers, fitters, electricians, plasterers, carpenters, plumbers, riggers and painters.

The control of drainage needs to be managed more appropriately in the maintenance program as uncontrolled drainage has become an increasingly serious problem affecting the integrity of the SHB's fabric in the vicinity of areas such as the stonework in The Rocks.

Figure 6.10 View of efflorescence caused by water penetration into the masonry capillaries of the southern approach bays.



(Source: Transport for NSW)

Figure 6.11 View of problems to stonework in The Rocks caused by uncontrolled drainage from the southern approach spans.



(Source: Transport for NSW)

Figure 6.12 View of a work platform on the southern approach spans used as part of repainting works.



(Source: Roads and Maritime 2007)

Figure 6.13 View of work platform specially designed to move along the approach spans.



(Source: GML 2013)

 Heritage Group, Department of Public Works and Services, Sydney Harbour Bridge Conservation Management Plan, prepared for NSW Roads and Traffic Authority, February 1998, p 113.
6.7.2 Painting

When the SHB was erected, initial protection of the steelwork was provided through painting. Depending upon:

... the careful application of a number of coats of red primer and top coats inside and outside the members. In the workshop all surfaces of the members, including contact surfaces, were given at least one coat of red lead. On site, at least two further top coats were applied of a grey paint with a high lead content.⁸

Since then, maintenance of the steelwork has been undertaken through a strategy of spot repair and overall repainting. Red lead primer was used up until 1985 when the environmental and health hazards associated with the use of lead paints made their continual use unacceptable. Currently, repainting utilises two paint systems, both of which make use of zinc based primers.

In March 2003, the then-RTA commenced the progressive removal of existing leadbased paint and the application of a replacement high performance paint system to all steel members of the southern approach spans. The removal of the existing paint was achieved by an abrasive blasting process within fully self-contained work platforms suspended under the deck level which allowed for access to the steelwork, the control of noise and the safe removal of lead waste. Attached to each platform were air compressors and other equipment. The work platforms were designed to move along the approach spans as each section of work was completed. The need for full repainting (including the removal of existing layers) will need to be considered in the future for the remaining sections of the SHB. In addition to the steel arch, other parts of the SHB have been subject to painting and anti-graffiti treatment including the northern approach underbridges, the Argyle Substation and Switchhouse and the commercial frontage of the SHB Concessionaire's office.

Policies are required to ensure that the colours and types of paint used on all areas of the SHB are appropriate. The use of paints with anti-graffiti properties is an important maintenance strategy, but it is important that these do not affect the integrity of the fabric.

Figure 6.14 View of stone deterioration beneath the southern approach spans.



(Source: GML 2013)

6.7.3 Ageing fabric

Although the SHB is maintained in excellent structural condition, a growing concern which needs to be addressed is the ageing fabric of the SHB, particularly the cement render used on the masonry abutments adjacent to the approach spans on both the northern and southern sides. Management of ageing fabric should be seen as an ongoing process and its incorporation into the maintenance program is essential to prevent *ad hoc* repairs from occurring. A procedure for the continual monitoring of the SHB's fabric and maintenance of its integrity is essential.

6.7.4 Asset register and record keeping

In the period since the adoption of the 1998 CMP, conservation policy implementation (including maintenance and minor repairs) has been based on the Sydney Harbour Bridge Conservation Management Plan— Inventory Records 1997. This approach has proved effective and has achieved broad acceptance by Transport for NSW personnel responsible for the ongoing care and management of the SHB. It is proposed that the precinct based structure contained in

 Heritage Group, Department of Public Works and Services, Sydney Harbour Bridge Conservation Management Plan, prepared for NSW Roads and Traffic Authority, February 1998, p 114. the Inventory Records be retained and that they continue to provide the basis for the ongoing care and management of the SHB until such time as it is reviewed.

Roads and Maritime (now Transport for NSW) prepared an Asset Register for the SHB. The register supplements the Inventory Records document, using the same asset numbering system. It includes all non-heritage assets such as mechanical equipment, utilities and new gantries. The Asset Register also elaborates on the shared responsibility in the management of the SHB assets; and provides guidance on the physical boundaries of responsibility between stakeholder Transport for NSW units and external stakeholders.

The register includes work procedures that are essential to the ongoing management and maintenance of the SHB. The register needs to be regularly updated and accessible by key members of the SHB Strategic Infrastructure team.

Any photographs taken associated with works on the SHB should be lodged with Transport for NSW's photo library and included in the register if considered appropriate or useful.

Figure 6.15 View of the old tram tunnels.



(Source: Transport for NSW)

Figure 6.16 View of interpretation facilities in the Pylon Lookout.



(Source: Transport for NSW)

Figure 6.17 Repainting of the SHB—an opportunity to provide interpretation facilities during maintenance works.



(Source: Roads and Maritime 2012)

6.8 Interpretation opportunities

An Interpretation Plan for the SHB has been prepared and should be implemented as opportunities arise.⁹ There is significant opportunity to further develop interpretation facilities at the SHB. In the past, interpretation has been lacking in the following areas:

- The relationship between the SHB and the adjacent areas (The Rocks and Millers Point);
- The contemporary social significance of the SHB, such as its public and private uses (fireworks, weddings, etc);
- Old tram tunnels
- The cultural diversity of visitors to the SHB.

9. Godden Mackay Logan Pty Ltd, Sydney Harbour Bridge Interpretation Plan, prepared for the RTA, 2007.

In January 2013, the SHB Concessionaire launched its Mandarin Climbs which feature local Mandarin speaking climb leaders and commentary about Sydney's special connection to China.

There are also opportunities to use interpretation during major maintenance works. This would allow for the explanation of the issues associated with the conservation and maintenance of the SHB. For example, the removal of lead red paint and repainting of the SHB necessitates the blockage of part of the SHB walkway. The installation of signage or similar interpretive devices would help to communicate to the public the significance of the works and the problems associated with the maintenance and conservation of the SHB.

6.9 Statutory requirements

This section focuses on statutory requirements related to environmental planning and assessment, and particularly heritage management. It should be noted that other statutory considerations, such as WH&S may also apply.

6.9.1 Environment Protection and Biodiversity Conservation Act 1999

The Environment Protection and Biodiversity Conservation Act 1999 (Cwlth) (EPBC Act) protects matters of national environmental significance (MNES), including places on the National Heritage List and World Heritage properties. Activities that are likely to impact on MNES are subject to environmental assessment and approvals under the EPBC Act. This is separate and in addition to any applicable state assessment requirements.

National Heritage List

The SHB was listed on the National Heritage List (NHL) in March 2007. Listing on the NHL by the Commonwealth Minister requires that any alterations or works that could affect the National heritage values of the SHB be subject to the procedures set out in the *EPBC Act*. Under the *EPBC Act,* anyone undertaking actions which are likely to have a significant impact on the National heritage values of a place listed on the NHL requires the approval of the Commonwealth Minister.

The *EPBC Act* also has provisions for an appropriate management plan to be adopted and implemented for places listed on the NHL. This CMP provides guidance on the appropriate management of the SHB including its National heritage values for the purposes of the *EPBC Act*.

6.9.2 Environmental Planning and Assessment Act 1979

The Environmental Planning and Assessment Act 1979 (NSW) (EP&A Act) sets out requirements for land use planning and the environmental assessment of proposed developments and activities. That includes consideration of the impacts to the environment (both natural and built) and the community.

Under the Act, development proposals generally fall into the following categories.

a) Part 4 of the EP&A Act - development requiring consent

Part 4 of the *EP&A Act* sets out the procedures for assessing and approving development applications. There are various categories of development under this Part and different processes for development assessment and approval apply to each category. Certain small-scale minimal impact proposals do not require assessment or approval, subject to meeting specified outcomes (referred to as exempt development).

b) Part 5 of the EP&A Act - development not requiring consent

Part 5 of the *EP&A Act* is concerned with the environmental assessment of 'activities' which are primarily carried out by or on behalf of public authorities (such as utilities or transport infrastructure). The purpose of Part 5 is to ensure public authorities fully consider environmental issues before they undertake activities that do not require development consent under Part 4.

The bulk (but not all) of Transport for NSW's work on the SHB is assessed and determined under Part 5 Division 5.1 of the *EP&A Act* (with Transport for NSW being the determining authority).

If a Part 5 activity is likely to significantly affect the environment, an environmental impact statement will need to be prepared and considered before the activity may proceed. Any Transport for NSW activities that fall within this category are automatically required to be assessed as State Significant Infrastructure (see below).

c) State Significant projects

The *EP&A Act* provides specific assessment requirements for projects that are considered to be of economic, social or environmental significance to the state. Two separate assessment pathways exist for State Significant Infrastructure (SSI) and State Significant Development (SSD).

• State Significant Infrastructure:

Division 5.2, Part 5 of the *EP&A Act* applies to major infrastructure proposals. In particular, that includes linear infrastructure such as roads, railway lines or pipes which often cross a number of council boundaries. Relatively larger and more complex Transport for NSW projects are typically subject to assessment as SSI.

SSI projects are assessed by the NSW Department of Planning, Industry and Environment, with input sought from local government, other NSW Government agencies and the community as part of the assessment process.

State Significant Development:

Division 4.7, Part 4 of the *EP&A* Act applies to major development proposals classed as SSD. A range of development types, such as mines and manufacturing plants as well as warehousing, waste, energy, tourism, education and hospital facilities, are considered to be SSD if they are over a certain size or located in a sensitive environmental area. Some projects may also be considered SSD because they are located in precincts regarded as important by the NSW Government, including Sydney Harbour foreshore sites.

SSD projects are also assessed by the NSW Department of Planning, Industry and Environment, with input sought from local government, other NSW Government agencies and the community as part of the assessment process.

6.9.3 Heritage Act 1977 (NSW)

The Heritage Act 1977 (NSW) includes a range of provisions for identifying and protecting items of environmental heritage. In addition to the establishment of the State Heritage Register (SHR) under section 22 of the Act, these provisions include Interim Heritage Orders, Orders to Stop Work, State Authority Registers (Section 170), State Authority maintenance and management requirements (Section 170A) and relics provisions.

a) State Heritage Register listing and Heritage Council of NSW approvals

The SHR is a list of heritage items of particular importance to the people of New South Wales. It includes items and places (buildings, works, relics, movable objects or precincts) of State heritage significance, endorsed by the 'Heritage Council of NSW' (Heritage Council) and the Minister.

'Sydney Harbour Bridge, approaches and viaducts (road and rail)' is included on the SHR (gazetted 25 June 1999), as is 'Milsons Point Railway Station group' and 'The Argyle Street Railway Substation', which includes the area bounded by the SHB approach structure and reserves surrounding it from the Burton Street underbridge to the Lavender Street underbridge (gazetted 2 April 1999). In addition to these built structures, 'The Argyle Cut' and 'Dawes Point Battery remains' occur within the curtilage of the SHB and are individually listed on the SHR. The SHR database entries for these two listings are provided in Appendix A.

Section 57(1) of the Act requires a proponent to get Heritage Council approval before carrying out any of the following activities on an item or place listed on the SHR:

- a) Demolishing the building or work
- b) Damaging or despoiling the place, precinct or land, or any part of the place, precinct or land
- c) Moving, damaging or destroying a relic or movable object
- d) Excavating any land for the purpose of exposing or moving the relic
- e) Carrying out any development in relation to the land on which the building, work or relic is situated, the land that comprises the place, or land within the precinct
- f) Altering the building, work, relic or movable object
- g) Displaying any notice or advertisement on the place, building, work, relic, movable object or land, or in the precinct
- h) Damaging or destroying any tree or other vegetation on or remove any tree or other vegetation from the place, precinct or land

The Heritage Act requires the minimum standards of maintenance and repair apply to items included on the SHR to ensure that heritage significance is maintained. These standards are set out in the Heritage Regulation 2012, and relate to weatherproofing, fire protection, security and essential maintenance.

b) Exemptions from Heritage Act approval

Section 57(2) of the Heritage Act provides for a number of exemptions to Section 57(1) approval requirements. There are two types of Exemptions: Standard and Site Specific.

Standard Exemptions

 Standard Exemptions apply to all items on the SHR. Typical exempt works include routine maintenance, minor repairs and repainting in approved colours, upgrading of services, alterations to certain interiors or areas, and changes of use. The Heritage Council's Standard Exemptions are provided in Appendix D.

Site Specific Exemptions

- A range of Site Specific Exemptions have been developed for the SHB (Appendix E and below). These primarily relate to routine and minor works, but may also apply to other types of activities that are unlikely to have a significant impact on the SHB. Gazetted Site Specific Exemptions, when carried out in accordance with the guidelines and conservation policies laid out in the endorsed CMP, do not require endorsement or approval from Heritage NSW. The site specific exemptions for the SHB are as follows:
 - 1. Maintenance and minor repairs necessary to preserve and maintain the functioning of the structure as a transport and services corridor, for example pavement resurfacing, track laying, electric catenary replacement, traffic management, toll collection and navigational infrastructure, and pipework and cabling;

- 2. Maintenance and minor repairs necessary to maintain the appearance and setting of the Bridge including cleaning, painting and reinstatement of original or replica architectural and decorative elements.
- 3. Minor works necessary to preserve and maintain the functioning of the Bridge, for example drainage modifications, modifications to road, rail, navigational, traffic management and toll collection and other infrastructure;
- 4. Minor works necessary to preserve and maintain the functioning of utility supply and communications, for example modifications and improvements to power supply systems, communications cabling and water supply systems including fire hydrants;
- 5. Minor works necessary to preserve and enhance the security of the Bridge such as security fencing, video surveillance and detection systems;
- 6. Minor works necessary to upgrade and enhance the structural integrity of the Bridge that do not alter its overall form or shape or significantly change the appearance of bridge elements;
- 7. Minor works internal to the Bridge structure or structural members that do not physically change the external appearance of the Bridge or bridge members;
- 8. Temporary works including containment areas, scaffolding and enclosures necessary for the carrying out of maintenance, enhancement or upgrading works;
- 9. Minor internal and external changes to office spaces, retail and other tenancy spaces and recreational facilities;

- 10. Installation of safety or information signs, not being for commercial or advertising purposes;
- 11. Temporary and reversible works for the operation of special events;
- 12. Maintenance of roadways, footpaths, parklands and vegetation;
- 13. Minor subdivision in terms of State Environmental Planning Policy No. 4;
- 14. Change of use from approved use to a similar permissible use;
- 15. Display of names and/or logos of relevant New Year's Eve sponsors and partners below the Juliette balconies of the pylons and only during the Sydney New Year's 9PM and Midnight Fireworks Display event.
- 16. Works that in the opinion of the Executive Director of Heritage NSW, Department of Premier and Cabinet, are required for the security of the Bridge and bridge users, and that need to remain confidential.
- A range of Agency-Specific exemptions under Section 57(2) of the *Heritage Act* have been granted to Sydney Trains to manage rail infrastructure. While these are not specific for the SHB, they may apply to the rail operations and maintenance works for rail infrastructure on the SHB.

Additional applications for Site Specific Exemptions may be made to the Heritage Council for particular works or activities in certain areas of the site and/or for some or all of the works specified in a CMP which has been endorsed by the Heritage Council.

The works covered by Exemptions might change during the life of this CMP. It is recommended that any person proposing to do work on the SHB review the current list of Standard and Site Specific Exemptions, liaise with the Heritage NSW and/or contact the appropriate heritage specialist within Transport for NSW.

c) Section 170 of the Heritage Act

Section 170 of the *Heritage Act* requires government agencies to identify, conserve and manage heritage assets owned, occupied or managed by that agency. It requires that the government agencies establish, keep, review and amend a register of heritage items (Heritage and Conservation Register). The progress of agencies in preparing registers and managing their heritage assets is monitored by the Heritage Council.

In accordance with the Heritage Act, Roads and Maritime (now Transport for NSW) established a Section 170 Heritage and Conservation Register to record all heritage items in its ownership or under its control, including the following items:

- Roads and Maritime Services Movable Heritage Collection (SHI No. 4311604)
- Sydney Harbour Bridge, approaches and viaducts (SHI No. 4301067).

The following items are listed on the RailCorp Section 170 Heritage and Conservation Register:

- Milsons Point (Fitzroy Street) Underbridge (SHI No. 480822)
- Milsons Point (Lavender Street) Underbridge (SHI No. 4801823)
- Milsons Point Railway Station Group (SHI No. 481026, SHR No. 01194)
- North Sydney (Arthur Street) Underbridge (SHI No. 4801024)
- Sydney Harbour Bridge (Rail Property Only) (SHI No. 4801059)
- The Rocks (Argyle Street) Railway Substation and Switchhouse (SHI No. 4800006)
- The Rocks (Argyle Street) Underbridge (SHI No. 4801821)
- Wynyard Former Tram Tunnels (SHI No. 4800281).

The following items are listed under the PNSW Section 170 Heritage and Conservation Register:

- Cannon, Dawes Point Park, The Rocks (SHI No. 4500491)
- Dawes Point Battery remains, Hickson Road, The Rocks (SHI No. 5053114, SHR No. 01543)
- Dawes Point Heritage Precinct, George St, Lower Fort St, Hickson Rd & Harbour Promenade, The Rocks (SHI No. 4500497)
- The Rocks Conservation Area, The Rocks (SHI No. 4500458).

d) Section 170A of the Heritage Act

Transport for NSW and Sydney Trains have an obligation to maintain their heritage assets under Section 170A of the *Heritage Act*.

In accordance with Section 170A(1) of the Act, Transport for NSW must give the Heritage Council written notice (not less than 14 days) if it proposes to remove, transfer ownership, cease to occupy or demolish any place, building or work listed on its Section 170 Heritage and Conservation Register.

In accordance with Section 170A(2) of the Act, Transport for NSW must ensure that the SHB is maintained with due diligence in accordance with State Owned Heritage Management Principles approved by the Minister on advice from the Heritage Council.

In accordance with Section 170A(3) of the Act, Transport for NSW must also comply with heritage asset management guidelines which are issued by the Heritage Council to government instrumentalities. These guidelines deal with the conservation of the items entered on registers under Section 170 and items listed on the SHR. They can relate (but are not limited) to such matters as maintenance, repair, alteration, transfer of ownership and demolition.

e) Movable heritage

The 'Transport for NSW Movable Heritage Collection' entry on the 'Transport for NSW Section 170 Heritage and Conservation Register' includes a range of movable items, some of which relate to the SHB. Relevant items include 'Model of Main Bearing and Bridge'; 'Sydney Harbour Bridge Memorabilia Collection; Sydney Harbour Bridge Workshops Collection'; and 'Bronze Bracketed Lanterns'. Information about the collection, along with other entries on the Transport for NSW Section 170 Heritage and Conservation Register can be accessed via NSW Heritage's State Heritage Inventory.

Transport for NSW is currently reviewing the range of SHB movable heritage items to ensure that they are accurately addressed in the S170 Register listing.

Management and conservation strategies for the movable heritage collections associated with the SHB need to address some interpretation uses and concepts for display of the items. An additional issue for Transport for NSW is the lack of a policy or procedure regarding the management and curation of items that are acquired by or donated to Transport for NSW. Collections associated with the SHB that are currently owned and maintained by other authorities, including the Powerhouse Museum and the State Library, could also be investigated to see if a relationship of loan and display could be undertaken to ensure public understanding and appreciation of the items.

f) Archaeology

The relics provision of the Heritage Act was amended in 2009. The Act currently affords automatic statutory protection to relics that form part of archaeological deposits. Section 4(1) of the Act defines a 'relic' as:

Any deposit, artefact, object or material evidence that:

a) relates to the settlement of the area comprised of New South Wales, not being Aboriginal settlement, and,

b) is of State or local heritage significance.

Any excavation or works to a site listed on the SHR would require an excavation permit application under Section 60 of the Act for approval to carry out a Section 57(1) activity, except in accordance with a gazetted exemption or an excavation permit issued by the Heritage Council.

In Section 3.1.5, the archaeological assessments that have been undertaken on the northern and southern shores of Sydney Harbour are discussed. Other than known archaeological remains on the Dawes Point site, Hickson Road, The Rocks (which is listed on the SHR); the boundary area of the SHB (also listed on the SHR) is unlikely to contain any material that would be considered relics as defined under the *Heritage Act* and on the basis of the abovementioned assessments.

In the event that substantial or unexpected archaeological relics are encountered within the State Heritage Register area (of either of the listed items), Heritage NSW should be notified pursuant to Section 146 of the Act. Further assessment, and possibly further approval, may be required under Section 139 of the Act.

6.9.4 Roads Regulations 2018

The Roads Regulations 2018 is made under the Roads Act 1993 and commenced on 3 June 2008. It includes a range of provisions for roads, tollways, bridges, ferries and public gates. Specifically, Clause 48 contains the regulation of commercial activities on SHB and ANZAC Bridge, which stipulates that Transport for NSW's permission and permits must be obtained for certain activities on the SHB. These include offering any goods for sale or hire, offering any services for fee, gain or reward, conducting or participating in any entertainment or exhibition, public assembly or public procession, displaying any advertisement (other than on a vehicle travelling across the SHB) or distributing any advertising matter.

6.9.5 State Environmental Planning Policy (Infrastructure) 2007

The State Environmental Planning Policy (Infrastructure) 2007 (ISEPP) aims to facilitate the effective delivery of infrastructure across the state. The ISEPP assists the NSW Government, local councils and the communities they support by simplifying the process for providing infrastructure in areas such as education, hospitals, roads, railways, emergency services, water supply and electricity.

The ISEPP has been introduced to allow public authorities to undertake a range of minor works without needing to obtain approvals under the *Environmental Planning and Assessment Act 1979* (EP&A Act). All such works, however, must be of minimal environmental impact, must not impact on heritage or the amenity of surrounding areas, and must meet strict development standards including compliance with the Building Code of Australia and other relevant controls set out in the ISEPP.

Other legislation associated with delivering public infrastructure and services is not affected by the ISEPP. Relevant approvals, licences or permits under other legislation must still be obtained for infrastructure works. This includes approvals under the *Heritage Act*.

Clause 94 of ISEPP permits specified development on any land for the purpose of a road or road infrastructure facilities to be carried out by or on behalf of a public authority without consent. Such proposals are to be assessed under Part 5 Division 5.1 of the *EP&A Act*.

Development consent from local councils is not required for such activities. Part 2 of the ISEPP contains provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development.

6.9.6 Local planning schemes

The Environmental Planning and Assessment Act 1979 (EP&A Act) provides

for the preparation of planning instruments intended to guide land use and management at state, regional and local levels. The EP&A Act establishes a process for making and determining development applications. The main cultural heritage provision of the EP&A Act is the requirement for assessment of development proposals and a mechanism for the inclusion of heritage conservation provisions in planning instruments. The SHB is currently partly located within the City of Sydney and North Sydney Council local government areas.

In general, Transport for NSW's operational works related to road infrastructure would not require consent under local planning schemes, in accordance with the ISEPP. However, other provisions of ISEPP and other planning instruments may be relevant. In addition, other non-infrastructure works, such as works to the commercial tenancies, would still be subject to local planning regulations.

a) Sydney Local Environmental Plan 2012

The *Sydney Local Environmental Plan 2012* (LEP) is the main planning instrument for the City of Sydney.

The southern approach spans and curtilage of the SHB are identified in Schedule 5, Part 1 of the LEP 2012 (CSHI No. 1539*), which lists the heritage items within the LEP area. The site is also located within the Millers Point/ Dawes Point Conservation Area which is listed on Schedule 5, Part 2 of the LEP 2012 (C35).

Part 5.10 of the LEP contains the Heritage Conservation provisions. Clause 5.10 (2) states that development consent is required for the:

a) demolishing or moving any of the following or altering the exterior of any of the following (including, in the case of a building, making changes to its detail, fabric, finish or appearance):

(i) a heritage item,

(ii) an Aboriginal object,

(iii) a building, work, relic or tree within a heritage conservation area,

- b) altering a heritage item that is a building by making structural changes to its interior or by making changes to anything inside the item that is specified in Schedule 5 in relation to the item,
- c) disturbing or excavating an archaeological site while knowing, or having reasonable cause to suspect, that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed,
- d) disturbing or excavating an Aboriginal place of heritage significance,
- e) erecting a building on land:
 - (i) on which a heritage item is located or that is within a heritage conservation area, or
 - (ii) on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance,
- f) subdividing land:
 - (i) on which a heritage item is located or that is within a heritage conservation area, or
 - (ii) on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance.

Clause 5.10 (5) states that the consent authority may require a heritage management document to be prepared that assesses the extent to which the carrying out of the proposed development would affect the heritage significance of the heritage item or heritage conservation area concerned, for any development:

- a) on land on which a heritage item is located, or
- b) on land that is within a heritage conservation area, or
- c) on land that is within the vicinity of land referred to in paragraph (a) or (b).

The LEP also makes provision for the carrying out of minor works on heritage items such as the SHB by including Clause 5.10 (3), which states that development consent is not required if:

- a) the applicant has notified the consent authority of the proposed development and the consent authority has advised the applicant in writing before any work is carried out that it is satisfied that the proposed development:
 - (i) is of a minor nature or is for the maintenance of the heritage item, Aboriginal object, Aboriginal place of heritage significance or archaeological site or a building, work, relic, tree or place within the heritage conservation area, and
 - (ii) would not adversely affect the heritage significance of the heritage item, Aboriginal object, Aboriginal place, archaeological site or heritage conservation area, or
- b) the development is limited to the removal of a tree or other vegetation that the Council is satisfied is a risk to human life or property, or
- c) the development is exempt development.

Development consent is not required for those activities covered under the ISEPP.

b) North Sydney Local Environmental Plan 2013

The North Sydney Local Environmental Plan 2013 (LEP) is the main planning instrument for North Sydney Council. Schedule 5 of the LEP identifies the heritage items within the Council area and shows the section of the SHB situated within the North Sydney LEP boundary. Schedule 5 of the LEP identifies the following as heritage items:

- 'Sydney Harbour Bridge approach viaducts, arches and bays under Warringah Freeway' Sydney Harbour Bridge, north pylons (Item no. 10541)
- Bradfield Park (including northern section), Alfred Street South (Item No. 10538)
- Milsons Point seawall and wharf site (Item No. 10540).

Part 5.10 of the LEP contains the heritage conservation provisions. Clause 5.10 (2) states that development consent is required for:

- a) demolishing or moving any of the following or altering the exterior of any of the following (including, in the case of a building, making changes to its detail, fabric, finish or appearance):
 - (i) a heritage item,
 - (ii) an Aboriginal object,
 - (iii) a building, work, relic or tree within a heritage conservation area,
- b) altering a heritage item that is a building by making structural changes to its interior or by making changes to anything inside the item that is specified in Schedule 5 in relation to the item,
- c) disturbing or excavating an archaeological site while knowing, or having reasonable cause to suspect, that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed,
- d) disturbing or excavating an Aboriginal place of heritage significance,
- e) erecting a building on land:
 - (i) on which a heritage item is located or that is within a heritage conservation area, or
 - (ii) on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance,
- f) subdividing land:
 - (i) on which a heritage item is located or that is within a heritage conservation area, or
 - (ii) on which an Aboriginal object is located or that is within an Aboriginal place of heritage significance.

Clause 5.10 (5) states that the consent authority may require a heritage management document to be prepared that assesses the extent to which the carrying out of the proposed development would affect the heritage significance of the heritage item or heritage conservation area concerned, for any development:

- a) on land on which a heritage item is located, or
- b) on land that is within a heritage conservation area, or
- c) on land that is within the vicinity of land referred to in paragraph (a) or (b).

The LEP also makes provision for the carrying out of minor works on heritage items such as the SHB by including Clause 5.10 (3), which states that development consent is not required if:

- a) the applicant has notified the consent authority of the proposed development and the consent authority has advised the applicant in writing before any work is carried out that it is satisfied that the proposed development:
 - (i) is of a minor nature or is for the maintenance of the heritage item, Aboriginal object, Aboriginal place of heritage significance or archaeological site or a building, work, relic, tree or place within the heritage conservation area, and
 - (ii) would not adversely affect the heritage significance of the heritage item, Aboriginal object, Aboriginal place, archaeological site or heritage conservation area, or
- b) the development is limited to the removal of a tree or other vegetation that the Council is satisfied is a risk to human life or property, or
- c) the development is exempt development.

Development consent is not required for those activities covered under the ISEPP.

c) Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005

The Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 (Sydney Regional Environmental Plan 2005) is the main planning instrument with regard to the Sydney Harbour Catchment area.

Clause 15 of Part 2, Planning Principles, states the planning principles for heritage conservation:

- a) Sydney Harbour and its islands and foreshores should be recognised and protected as places of exceptional heritage significance,
- b) the heritage significance of particular heritage items in and around Sydney Harbour should be recognised and conserved,
- c) significant fabric, settings, relics and views associated with the heritage significance of heritage items should be conserved.

'The SHB, approaches and viaducts (road and rail)' is listed as a heritage item (Item 67) on the Sydney Regional Environmental Plan 2005. Part 3, Division 2 provides matters for consideration in the Foreshores and Waterways Area. Clause 26 requires that:

- a) The matters to be taken into consideration in relation to the maintenance, protection and enhancement of views are as follows:
- b) development should minimise any adverse impacts on views and vistas to and from public places, landmarks and heritage items.

Part 1, Clause 5 of the Sydney Regional Environmental Plan 2005 identifies the consent authority for development as 'the council of the local government area in which, or nearest to which, the land on which the development is proposed to be carried out'. This indicates that both North Sydney Council and the City of Sydney Council act as the consent authority with regard to developments on the north and south sides of the SHB respectively, unless the requirement to seek consent is exempted by the ISEPP.

Part 5 of the Sydney Regional Environmental Plan 2005 contains heritage provisions to conserve and protect heritage items in the waterway and within the land/water interface. The heritage provisions generally reflect the current model heritage provisions prepared by the Heritage NSW and aim to protect places and items of Aboriginal and non-Aboriginal heritage significance, and views associated with the heritage significance of heritage items.

The objectives of the Sydney Regional Environmental Plan 2005 in relation to heritage conservation are contained in Part 5, Division 1, Clause 53 of the plan:

- a) to conserve the environmental heritage of the land to which this Part applies, and
- b) to conserve the heritage significance of existing significant fabric, relics, settings and views associated with the heritage significance of heritage items, and
- c) to ensure that archaeological sites and places of Aboriginal heritage significance are conserved, and
- d) to allow for the protection of places which have the potential to have heritage significance but are not identified as heritage items.

d) Property NSW Act 2006

Property NSW (PNSW) manages the NSW Government's significant property portfolio and its places. PNSW encompasses the entities of the former Government Property NSW (GPNSW), the former Sydney Harbour Foreshore Authority (SHFA), Teacher Housing Authority of NSW (THA) and Waste Assets Management Corporation (WAMC). PNSW owns and manages \$3 billion worth of assets across 1,800 sites, as well as managing over 1,300 leases for NSW Government agencies.

The *Property NSW Act 2006* replaced the *Government Property NSW Act 2006* and the *State Property Authority Act 2006*.

All planning and heritage applications related to land owned by PNSW must receive its consent prior to being lodged for assessment with the Department of Planning, Industry and Environment. Therefore, consent from PNSW would be required for development on land in the vicinity of the SHB (such as Dawes Point Park).

6.9.7 Statutory approvals process

Depending on their scope, location, extent and permanency, works on the SHB may require approvals from the Commonwealth Minister, the Heritage Council, and either the City of Sydney Council or North Sydney Council.

For proposals affecting the SHB itself and within the SHB heritage curtilage (eg proposals by Transport for NSW, or other persons/tenants (such as the SHB Concessionaire) that are not covered by planning instrument exemptions that allow development without consent, such as ISEPP and Standard or Site Specific Exemptions, will require heritage impact assessment and approval by one or more of the above-mentioned consent authorities.

For proposals within the heritage curtilage of the SHB, on surrounding lands or that may have an impact on the heritage values of the SHB, such as its visual setting (eg proposals by private landowners, including Councils), the proponent must undertake a process of liaison, notification, application, assessment and approval seeking from one or more of the above-mentioned consent authorities. Applications under the *EP&A Act* or the *Heritage Act* generally need to be accompanied by a CMP or a Heritage Impact Statement (HIS), particularly for large and/ or complex sites and/or where a significant level of development is proposed. A HIS assesses the impacts of the proposed development on the significance of the place and consistency of the proposal with the CMP or other relevant documents.

The listing of the SHB on the SHR also means that the owner is required to meet the minimum maintenance requirements set out in Section 118 of the *Heritage Act* to ensure long-term conservation. In a situation where the item remains in constant use (as for the SHB), these maintenance requirements should not represent any additional requirement other than keeping it in a sound and secure condition.

As the SHB is listed on the NHL, projects with the potential to impact upon the National Heritage values of the SHB may also need approval under the *EPBC Act*.

7.0 Conservation policies

7.1 Introduction

7.1.1 Role of conservation policies

The policies in this section provide for the care and management of the SHB, and guide its conservation as a State and a National heritage item. The policies take into account key issues and opportunities arising from the heritage values of the SHB, the National Heritage management principles, the Burra Charter, statutory requirements, and the physical condition and integrity of major components and elements.

The policies provide for the retention and enhancement, through appropriate conservation and interpretation, of the heritage values of the SHB and approach structures, including its setting, views, ongoing operations and historical and social associations. The policies provide for appropriate consultation with consent authorities and the community, as well as the training of staff.

7.1.2 Approach

The conservation policies have been developed as a result of historical and site based research, including a review of the previous 1998 and 2007 CMPs prepared for the SHB and other existing documentation.

The policies are based in part on the 1998 CMP conservation policies. These have been revised and amended in light of the passage of time and changing heritage best practice; changes in the use of the SHB for activities such as the SHB Concessionaire's guided climbs; increased security requirements; and operational considerations and requirements. The preparation of the conservation policies and implementation strategies has addressed additional considerations such as the movable heritage associated with the SHB, the management of archaeological resources, interpretation of the SHB and its history and its listing on the National Heritage List.

The conservation policies also take into account input provided by representatives of the City of Sydney Council, the Department of Premier and Cabinet, Destination NSW, North Sydney City Council, Transport for NSW, Property NSW and Sydney Trains (representing RailCorp).

The conservation policies are organised as follows:

- Heritage management principles providing the framework and basis of the conservation policies
- General policy statements relating to conservation of the cultural significance of the place
- General policies relating to the role of the CMP and associated administrative requirements
- Specific policies for the conservation of the place, including significant character, features and fabric, and the relationship to its wider setting
- Policies for use, managing change, new development and access for the place and particular components
- Policies for interpretation and engagement with the public
- Polices to deal with the statutory requirements of national, state and local government legislation.

General policies and guiding heritage principles are identified in the first instance to provide the framework for more detailed policies relating to specific aspects and components of the place which follow.

7.2 Guiding principles

7.2.1 Introduction

The cultural heritage values of the SHB relate to its historical and social associations, its fabric and associated components, and its setting. The purpose of the CMP is to facilitate the conservation of these values consistent with the maintenance and repair of the SHB as a publicly owned asset, and its ongoing use as the main vehicular crossing across Sydney Harbour.

The SHB is listed on the National Heritage List (NHL) and the NSW State Heritage Register (SHR), and is therefore subject to the provisions of the EPBC Act and the Heritage Act respectively. An obligation is created under the Heritage Act and the EPBC Act to retain and conserve those parts or aspects of the SHB that contribute to its significance at state and national levels. The SHB is also located within the Sydney Opera House buffer zone as defined in the Sydney Regional Environment Plan (Sydney Harbour Catchment) 2005 (Figure 1.5). The buffer zone aims to ensure that any development within its boundaries respects and conserves the heritage values of the Sydney Opera House, including the World Heritage values protected under the EPBC Act. However, these listings do not prohibit change or alteration to the existing fabric and components. The ongoing management of the SHB is affected by a number of constraints and opportunities which are outlined in Section 6.0. These include not only the physical condition of the SHB and its components, but also traffic, rail, cyclist and pedestrian requirements and the increasing security concerns (as a State government asset and a highly visual symbol of both the city of Sydney and Australia).

Any response to this set of potentially conflicting constraints necessitates recognition of the need for change, mostly in the form of traffic management, security installations, repair and maintenance of the SHB. Such change can and should be consistent with the heritage values of the place, and be planned and managed such that design decisions are informed by a thorough understanding of its heritage values. Structured heritage management principles and conservation policies specific to the SHB should guide appropriate policy development and future site planning.

7.2.2 Heritage management principles

Heritage management principles set the standard and scope for the way places should be managed in order to protect heritage values for future generations. These principles should be used when preparing and implementing management plans and programs for the National Heritage place, and to guide the management of its heritage values.

The following National Heritage management principles are set out in the Environment Protection and Biodiversity Conservation Regulations 2000 (Schedule 5B) of the EPBC Act.

Schedule 5B National Heritage Management Principles (Regulation 10.01E)

- 1. The objective in managing National Heritage places is to identify, protect, conserve, present and transmit, to all generations, their National Heritage values.
- 2. The management of National Heritage places should use the best available knowledge, skills and standards for those places, and include ongoing technical and community input to decisions and actions that may have an adverse impact on their National Heritage values.
- 3. The management of National Heritage places should respect all heritage values of the place and seek to integrate, where appropriate, any Commonwealth, State, Territory and local government responsibilities for those places.
- 4. The management of National Heritage places should ensure that their use and presentation is consistent with the conservation of their National Heritage values.
- 5. The management of National Heritage places should make timely and appropriate provision for community involvement, especially by people who:
 - (a) have a particular interest in, or association with, the place; and
 - (b) be affected by the management of the place.

- 6) Indigenous people are the primary source of information on the value of their heritage and the active participation of indigenous people in identification, assessment and management is integral to the effective protection of indigenous heritage values.
- 7) The management of National Heritage places should provide for regular monitoring, review and reporting on the conservation of National Heritage values.

The requirements for the preparation of a management plan for a National Heritage place are contained in the *EPBC Act* and Regulations. Included in **Appendix G** is the EPBC Act Compliance Checklist, which shows how this CMP fulfils the requirements for a management plan.

As a heritage item on the SHR, and pursuant to Section 119 of the *Heritage Act*, Transport for NSW has an obligation to ensure that the SHB is maintained and repaired to standards that are not less than the minimum standards set out in the 'Heritage Regulations 2012, Part 3, Division 1—Minimum standards of maintenance and repair'.

Transport for NSW also has obligations to maintain their heritage assets under Section 170A of the *Heritage Act* which requires government agencies to give the Heritage Council written notice (not less than 14 days) before the agency removes, transfers ownership, ceases to occupy or demolishes, any place, building or work listed on its 'Section 170 Heritage and Conservation Register'.

In accordance with Section 170A(2) of the Heritage Act, Transport for NSW must ensure that the SHB is maintained with due diligence in accordance with State Owned Heritage Management Principles approved by the Minister on advice from the Heritage Council.

In accordance with Section 170A(3) of the Heritage Act, Transport for NSW must also comply with Heritage Asset Management Guidelines which are issued by the Heritage Council to government instrumentalities. These guidelines deal with the conservation of the items entered on registers under Section 170 and items listed on the SHR. They can relate to (but are not limited to) such matters as maintenance, repair, alteration, transfer of ownership and demolition.

7.3 General policy statement

The following conservation policies are a synthesis and result of an understanding of the heritage values, legislative constraints, best practice heritage conservation methods and operational requirements for the SHB. They seek to conserve the heritage significance of the SHB while allowing for its ongoing use (and works associated with its functioning) as the main vehicular crossing for Sydney Harbour.

Policy 1 - Retention of cultural significance

- 1.1 The SHB is a place of outstanding cultural significance in the local, State and National context which should be retained and conserved.
- 1.2 Any change in ownership, future uses, maintenance, repair and/or adaptation works and asset management programs should include retention and appropriate care of the significant elements and attributes of the place as a matter of highest priority.
- 1.3 All current and future owners, managers and consent authorities responsible for the care and management of the SHB and/or its setting should be advised of, and be jointly responsible for, the conservation of the heritage significance of the SHB.
- 1.4 Conservation of the SHB should accord with the definitions and principles of *The Burra Charter: the Australia ICOMOS Charter for Places of Cultural Significance 2013*, and include all significant components and attributes of the place, including its setting, fabric, movable items, archaeological relics and non-tangible values.

- 1.5 Alternatives to actions with adverse heritage impacts to the heritage values of the SHB must be explored and assessed before such actions are undertaken.
- 1.6 The SHB must be protected from physical or environmental damage by appropriate security, maintenance and management procedures.

7.4 Role of the CMP including adoption and review of policies

The following policies relate to the role of the CMP and the associated administrative requirements in its preparation and endorsement.

Policy 2 - Adoption of policies

The primary 'relevant party' in this context is Transport for NSW, the current owner/ operator of the SHB. Other Commonwealth, state or local government agencies that currently have some jurisdiction over or responsibility for its care, management or heritage protection include: the Department of Agriculture, Water and the Environment; Heritage NSW; Heritage Council; City of Sydney Council and North Sydney Council (subject to limitations under the ISEPP); Property NSW; and Sydney Trains.

- 2.1 The conservation policies set out in this document should be adopted by Transport for NSW as a guide to future conservation and development of the SHB.
- 2.2 The SHB CMP should be endorsed by the Heritage Council.

Policy 3 – Coordination with management plans

The primary role of this CMP is to provide updated conservation management policies and implementation strategies for current and future management of the SHB.

Associated management plans that should be coordinated with this CMP include the following documents:

- SHB Conservation Management Plan– Volume 2: Inventory Records (2020), originally prepared by the Heritage Group, Department of Public Works and Services in 1997.
- Transport for NSW Heritage Guidelines (2015). These guidelines provide Transport for NSW staff with advice on the appropriate management of its heritage assets, as well as heritage items that it may affect as a result of its construction and maintenance activities.
- SHB Interpretation Plan (2007), prepared by Godden Mackay Logan. This plan provides a framework and ideas to improve the public understanding, awareness and appreciation of the heritage significance of the SHB.
- SHB Asset Register, prepared by Transport for NSW. This is a register of assets and fabric associated with the SHB for which Transport for NSW has a responsibility to manage and maintain.
- The Greater Sydney Roads Asset Management Plan and any associated Sydney Harbour Bridge Asset Management Plan
- 3.1 The analysis and recommendations of the CMP should be checked against and coordinated with any associated management plans for the SHB to ensure consistency of aims, approach and outcomes.

Policy 4 - Distribution of the CMP

The policy seeks to encourage ongoing community consultation and communication, which is critical to the implementation of this CMP, by making appropriate information readily available (including at the offices of Transport for NSW and their website).

4.1 Copies of the final report should be lodged with the Department of Agriculture, Water and the Environment (Canberra); the Mitchell Library, State Library of NSW (Sydney); and the library at Heritage NSW.

- 4.2 Copies should also be held by Transport for NSW and Sydney Trains and be referenced on their S170Registers and relevant State Heritage Register listings.
- 4.3 Copies may also be made available at the local libraries of the City of Sydney and North Sydney.

Policy 5 - Monitoring and review of the CMP

5.1 Implementation of the CMP should be continuously monitored and the document formally reviewed every five years to ensure the effectiveness of the conservation policies, to monitor whether works planned or being carried out conform to the policies, and to take account of changed conditions.

Policy 6 - Professional heritage advice

- 6.1 Professional advice should be obtained from experienced heritage practitioners with relevant expertise to review, update and/or amend policies contained in this CMP, as required.
- 6.2 A proponent must obtain advice from a heritage practitioner (which may include Transport for NSW heritage specialists) when proposing to carry out a controlled activity under s 57(1) of the *Heritage Act*, except where:
 - a) Specialist heritage advice is not required to comply with a particular Standard Exemption. It should be noted that certain exemptions (such as Standard Exemption 3: Alteration to non-significant fabric) may require written specialist heritage advice if the proposed works are not already covered by relevant existing policies such as the policies in this CMP. Refer to Appendix D for a link to the Standard Exemptions.
 - b) The proponent is Transport for NSW (or its agent) and the work or action is consistent with Site Specific Exemptions referred to in section 6.9.3 of this CMP.

6.3 Transport for NSW or its agent must obtain advice from an external heritage practitioner where an approval under s 60 of the *Heritage Act* is required.

Policy 7 - Conformity with National and international conservation principles

7.1 The future conservation and development of the SHB should be carried out in accordance with nationally and internationally recognised heritage conservation principles, including those set out in Section 7.2.2 of this CMP. Where there is any conflict between these principles and the conservation policies set out in this section, the CMP policies will prevail.

Policy 8 – Excellence in heritage management

The SHB's combination of heritage attributes - its role as a major part of Sydney's transport network and as a destination for recreation and cultural tourism, provides a unique opportunity to implement and actively promote the highest standards of heritage conservation management and practice. This goal, however, needs to be generally recognised and supported by all relevant management and works planning and procedures.

8.1 The SHB should provide a national benchmark for excellence in the heritage conservation management of a major work of engineering in public ownership.

7.5 Conservation methodology

The following policies relate to the conservation of the SHB, including retention of its significant character, features and fabric, and the relationship to its wider setting.

The Sydney Harbour Bridge Conservation Management Plan Compliance Checklist -Template **(Appendix F)** must be completed and provided to the SHB asset manager when seeking their signature as landowner on any s60 application form.

7.5.1 Management generally

Policy 9 - Priority of cultural heritage value

9.1 Decisions regarding change to the SHB should be based on a clear and balanced understanding of the impacts on its cultural heritage values - positive and negative, and measures taken to either avoid or mitigate adverse impacts including cumulative impacts.

Policy 10 - Management objectives

- 10.1 Ongoing management of the SHB should aim to:
 - Retain its fundamental cultural heritage values and attributes
 - Conserve (including ongoing maintenance of) significant elements and values
 - Enhance opportunities for presentation and interpretation of the history of the SHB to the public.
 - Continue its function as the main road, rail, pedestrian and cycle connection across Sydney Harbour, in continuous use since 1932.
 - Continue and enhance its linkage with associated elements within the setting of the SHB, including Bradfield Park and Plaza, Dawes Point (Tar-Ra) Park and other foreshore areas within the view lines of the SHB (via interpretation, related activities, transport routes, etc).

Policy 11 – Management responsibilities and delegations

- 11.1 Transport for NSW shall appoint an asset manager responsible for the development, management and implementation of the CMP policies.
- 11.2 The asset manager appointed by Transport for NSW is responsible for ensuring works undertaken on the SHB are done so in accordance with this CMP.

11.3 The asset manager appointed by Transport for NSW is the appropriate delegate to sign as landowner on any s60 application form for proposals affecting the fabric of the SHB.¹

7.5.2 Retention of original design and setting

Policy 12 – Maintaining key views of the Sydney Harbour Bridge in its setting

Key attributes which contribute to the significant physical and visual character of the SHB in its harbour setting include:

- The overall size of the SHB, including the main arch, approaches, pylons, the substation and switch house
- Its visual prominence and landmark role in the topography of the Sydney Harbour (particularly in views from and across the harbour)
- The setting of Dawes Point (Tar-Ra) Park and Bradfield Park including Milsons Point Station – entrance, canopies and forecourt area.

These attributes should be specifically acknowledged, protected and interpreted in future planning and development of the SHB. Proposed changes and/or development that could adversely impact on these attributes or their interrelationships (and thus affect the extent to which they locate and distinguish the SHB within its harbour setting) should be prohibited and/ or strictly limited. Where there is likelihood that a proposal may impact on key views to the SHB, it is recommended that a visual impact assessment be prepared by the proponent to inform the project design.

Sub-policies 12.3 and 12.4 will require a cooperative approach between Transport for NSW, and other NSW Government entities including but not limited to, Department of the Agriculture, Water and the Environment (Clth), Heritage NSW, Property NSW and local councils (particularly North Sydney and the City of Sydney), to ensure that new

1. When seeking landowner approval for works on land not owned by Transport for NSW such as Dawes Point Park or Bradfield Park, approval must be sought from the relevant landowner which may include City of Sydney, North Sydney Council or Property NSW.

development within the context of the SHB does not result in an adverse impact on its heritage values.

The provisions and coverage of the Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 (NSW) (Sydney Regional Environmental Plan 2005) and the relevant local environmental plans provide the primary statutory means to achieve compliance with these policies.

Refer to Section 5.5 of this CMP for guidance on views to and from the SHB.

- 12.1 The significant physical and visual character of the SHB within its harbour setting should be conserved.
- 12.2 Views and vistas to and from the SHB from key points to the north, south, east and west should be maintained.
- 12.3 New structures or large plantings on the harbour foreshores of Dawes Point and Milsons Point should not obscure the visual form and setting of the SHB.
- 12.4 New structures or large plantings on the northern or southern sides of the harbour should not obscure or detract from views of Sydney Harbour and the city from the SHB.

Policy 13 - Retention of existing open space for public use/recreation

As with Policy 12, this policy will require a cooperative approach between Transport for NSW and Heritage NSW, Property NSW and local councils (particularly North Sydney and the City of Sydney) to ensure that the open space settings for the SHB support spans and pylons are retained and accessible for public recreation.

- 13.1 The existing parklands adjacent to the SHB are of Exceptional significance and should remain as public parks to continue to provide passive recreation and facilitate unimpeded views to the SHB.
- 13.2 The future management of the SHB, approaches and parklands should ensure the continuation of their open

character and scale, providing an unencumbered setting whilst retaining the existing open spaces and historic viewing areas.

Policy 14 - Integrity of original design

- 14.1 The clarity of the main structural form and silhouette of the SHB and its associated elements, when viewed from key points around the harbour (as shown in Figure 5.2), should be maintained and not obscured.
- 14.2 Views of the original form of the granite pylons and approach span piers should be maintained, and any appropriate new uses accommodated within these elements.
- 14.3 The fabric and design integrity of the main components of the SHB, comprising the arch, hangers, roadway, pylons, approach spans, piers; and approaches including tunnels, tenancy spaces, the substation and switch house, and Milsons Point Railway Station, should be conserved.
- 14.4 Significant/original decorative and/ or functional minor elements, such as cast iron railings, steel windows, rainwater elements, pressed metal awnings, balustrades, lighting, steps and decoration, should be conserved.
- 14.5 The arrangement and large open volumes of internal spaces in the pylons and approach structures should be conserved.
- 14.6 Where feasible and reasonable, original design elements that contribute to the heritage value of the bridge should be restored or recreated, and the introduction of distracting elements minimised.

Policy 15 - Maintenance and minor works generally

Maintenance and minor works which comply with the Standard Exemptions **(Appendix D)** may be carried out without Heritage Council approval (ie section 60 approval). However, Transport for NSW must retain a record showing how it has complied with the Standard Exemptions, and be able to produce this if subject to an audit.

Maintenance and minor works described in the Specific Exemptions **(Appendix E)** or Agency-Specific exemptions (eg Sydney Trains) may be carried out without Heritage Council approval or notifying Heritage NSW provided the works are consistent with the policies contained in this CMP.

The scope of any proposed maintenance and minor works on the SHB should seek to retain existing significant attributes and fabric wherever possible, rather than replacing these. New work should take particular care to retain (by restoration and/ or reconstruction) original/early detailing, and particular idiosyncrasies of significant fabric and features.

- 15.1 Regular maintenance and minor works should be carried out to ensure that the functional and structural integrity of the SHB is retained. The scope of maintenance and minor works proposed for the SHB should be guided by the heritage philosophy of 'doing as much as necessary but as little as possible' to minimise the cumulative heritage impact.
- 15.2 A maintenance program should be prepared and regularly revised to provide the basis for the ongoing care and management of the SHB as a publicly owned asset and to conserve its cultural heritage significance.
- 15.3 The SHB Conservation Management Plan—Inventory Records (Volume 2 of this CMP) and the SHB Asset Register should be used to assist with the ongoing maintenance and repair of the SHB.
- 15.4 All machinery, equipment and other movable elements should be regularly inspected and maintained.

15.5 The schedule of maintenance and repair works which can be undertaken without approval from the Heritage Council, pursuant to the Standard or Specific Exemptions under Section 57(2) of the Heritage Act, should be reviewed on a regular basis and, if necessary, updated

Policy 16 – Use appropriate specialist personnel

Persons responsible for maintaining the fabric of the SHB should familiarise themselves with the CMP.

- 16.1 Maintenance and repair works should be undertaken by people with proven expertise in the relevant field and under adequate supervision.
- 16.2 A conservation specialist should be involved in developing and evaluating new conservation methods affecting significant/original fabric, including the steel structure, the granite pylons and concrete structures including the approach span piers.
- 16.3 Specialist advice and training on the heritage value of machinery and equipment on the SHB should be obtained from an industrial archaeologist or specialist heritage practitioner.
- 16.4 Significant fabric should be retained and maintained in situ and, where feasible, in its current state and form.

Policy 17 – Records of intervention and maintenance

Conservation work includes all activities as defined in the Burra Charter, from basic maintenance and repair works through to reconstruction and adaptation. Site components include all built elements and other structures, open areas, movable items and archaeological sites within the CMP curtilage.

- 17.1 All works to the SHB should be appropriately recorded, and the records catalogued and stored as part of the management of the SHB archives. This includes any specialist heritage advice used to support s60 approvals and/or s57 Standard Exemptions.
- 17.2 Documentation of conservation works should include the purpose of the works, the methodology used and the effectiveness of any monitoring.

7.5.4 Managing adaptation and change Policy 18 – General management of adaptation and change

The imperatives for the ongoing operation of the SHB as part of the Sydney transport network must be reconciled against the obligation to conserve its cultural heritage values.

Where adaptation or change is required, alternative solutions must be considered to ensure that an approach with the least possible heritage impact on the SHB is implemented. For example, where new fixtures or modifications are required on the SHB, every attempt should be made to ensure that those fixtures or modifications are reversible. This may include utilising existing drill holes in the steelwork, or using clamps, bolts or other fastening methods to affix new features without removing or permanently impacting on existing fabric.

In situations where an appropriately balanced outcome is not achievable and major heritage values would be adversely impacted upon, heritage conservation requirements should prevail over the proposed change/development unless by doing so the security, structural stability or basic operational viability of the SHB is compromised.

Heritage Council approval (ie section 60 approval) is required for most proposals involving the adaptation and change of the SHB. Certain routine or minor works may be permissible without section 60 approval. (Refer to Policy 6, Policy 15 and Section 6.9.3 of this CMP for further guidance).

The Sydney Harbour Bridge Conservation Management Plan Compliance Checklist -Template **(Appendix F)** must be completed and provided to the SHB asset manager when seeking their signature as landowner on any s60 application form.

- 18.1 All proposals for intervention, adaptation and change should be evaluated in terms of the nature of the proposal, its purpose, long-term context and how this relates to the identified cultural heritage values of the SHB. Protection and enhancement of the significant elements of the SHB through appropriate adaptation and change for new or additional necessary functions should be a key management goal.
- 18.2 Changes to the SHB due to its ongoing its historically significant function as the main road, rail, pedestrian and cycle connection across Sydney Harbour, in continuous use since 1932 should be given priority over changes determined by the needs of secondary uses such as tourism and recreation.
- 18.3 Assess and minimise the impact of physical alterations on the cultural heritage significance of the SHB, particularly where these changes are outside the Standard or Site Specific Exemptions under Section 57(2) of the *Heritage Act*.
- 18.4 Any adverse impacts on the heritage values of the SHB, as a whole or its

particular components arising from new work, should be minimised by:

- Exercising caution and reviewing the imperative for any new work with potentially adverse heritage impacts
- Examining alternative solutions and their relative impacts to determine the option with the least adverse heritage impacts
- Ensuring, where possible, that changes (to use, layout and fabric) are reversible and/or have minimal adverse impacts on the cultural heritage significance of the SHB. This should include restricting changes to areas/fabric of no/less heritage value which have higher tolerances/thresholds for change.
- 18.5 New work must aim to facilitate the continuation of the historically significant function of the SHB as the main road, rail, pedestrian and cycle connection across Sydney Harbour, without obscuring or adversely affecting the integrity of the original design, significant fabric or its heritage values.
- 18.6 Proposals affecting the SHB should be assessed to determine whether their purpose is compatible with the fundamental heritage values and historic use of the SHB as the main road, rail, pedestrian and cycle connection across Sydney Harbour.
- 18.7 The introduction of new services should be designed to be as unobtrusive as possible. Redundant original or early services should be recorded prior to removal.
- 18.8 The attachment of services to steelwork should be minimised and located as unobtrusively as possible. Where existing services, such as electrical power and compressed air, are obtrusive, opportunities should be investigated for their relocation to reduce visual impact on significant fabric.

- 18.9 Services should not be fixed to the external surfaces of granite or rendered concrete elements such as the pylons or approach span piers.
- 18.10 New work should be designed in accordance with Burra Charter principles, particularly the requirements of Article 22.2 that it readily be identifiable as new work, but at the same time respect and have minimal impact on the cultural significance of the SHB.
- 18.11 Heritage practitioners must consider the cumulative impacts of proposals on the SHB, particularly where their advice would accompany a section 60 approval application or be used to assess the appropriateness of a particular exemption.

Policy 19 - Lighting

- 19.1 All remaining original SHB lighting should be retained, conserved and used where possible.
- 19.2 The design and installation of new light fittings for use on the SHB should complement the design character of significant bridge elements, and be reversible.
- 19.3 Where possible, original lighting design elements should be restored or replicated and the introduction of distracting elements minimised to allow an appreciation of the character and excitement of the crossing.

Policy 20 - Traffic, safety and directional signage

- 20.1 Transport for NSW should aim to minimise the visual impacts of all signage on the SHB by developing a coordinated approach.
- 20.2 Historic signs inside the workshops and elsewhere on the SHB should, if possible, be retained in situ, or otherwise conserved for use as part of the interpretation of the SHB.

- 20.3 All new signs (including leased areas of the approaches, pedestrian, cycling, traffic, safety and directional) installed on the bridge, approaches and approach spans should form part on an integrated range of signs that complement the history and character of the SHB.
- 20.4 All signage is to confirm to Work Health and Safety requirements.

Policy 21 – Sydney New Year's Eve Welcome to Country, 9pm Family and Midnight Fireworks Displays and Bridge Effects

Site Specific Exemption 15 (see Appendix E) allows this activity to proceed without the need to notify Heritage NSW. Refer to **Appendix J** for a copy of the Sydney New Year's Eve Agreement 2016-2020 between City of Sydney and Roads and Maritime Services (now Transport for NSW).

- 21.1 The SHB should continue to be used for displays, projections and fireworks associated with the Sydney New Year's Eve Welcome to Country, 9pm Family and Midnight Fireworks Displays and Bridge Effects.
- 21.2 The scope of works associated with the above activity is to be undertaken in accordance with a Memorandum of Understanding agreed to by then Roads and Maritime (now Transport for NSW) and the City of Sydney.²
- 21.3 In accordance with the above agreement, supporting sponsors' names may only be projected onto the pylons during the event. Sponsors' names must only be projected as static, black and white images, below the balcony level. This approach is to ensure consistency and to ensure such projections are managed in an appropriate manner.

Policy 22 – Special uses of the Sydney Harbour Bridge

The SHB may be used from time to time to support special events or celebrations such as New Year's Eve, Vivid or Anzac Day. Such events must have, as a minimum standard, relevance at a State level.

Methods to support such events may include, but not be limited to, the use of banners, special lighting, projections, creative displays or fireworks.

Similar to the Sydney Opera House, the SHB should not be used as a giant billboard or commercial advertising opportunity. Transport for NSW reserves the right to refuse any proposal which it considers does not meet the standard of a State significant event. Further, Transport for NSW reserves the right to limit the number of such events to avoid overuse and ensure they remain special.

Refer to Policy 32 for proposals seeking to take advantage of secondary tourism opportunities on the SHB.

Refer to Specific Exemption 11 (see **Appendix E**) for the carrying out of 'temporary and reversible works for the operation of special events'.

Requests related to the flying of flags on the SHB are managed by the Department of Premier and Cabinet and should be referred to that department.

- 22.1 Non-operational uses of the SHB require the written permission of Transport for NSW's SHB Asset Manager or their delegate. Transport for NSW reserves the right to refuse any such application.
- 22.2 Special uses of the SHB are not permitted, where the use:
 - Would impact on the physical and/or visual integrity of the SHB, including key views.

 The current MOU between 'Roads and Maritime' (now Transport for NSW) and the City of Sydney is the Sydney New Year's Eve Agreement (2016-2020), 24 November 2016.

- Would be incompatible with the primary use of the SHB as a transport corridor or compromise the security requirements of the SHB
- Does not meet the standard of a State significant event.
- 22.3 In accordance with Policy 24 'Advertising', proposals that are considered to be advertisements or contain advertisements are not permitted on the SHB under Section 57(1)(g) of the Heritage Act 1977.

Policy 23 - Use of approaches

The SHB approaches, including Middlemiss Street and Ennis Road (north side) and Cumberland Street (south side) tenancy bays are of high significance, particularly because they substantially retain their large open character which was a feature of the approaches. The bays should continue to be available for lease by a range of businesses and organisations. However, particular care should be taken with the design of tenancy fitouts for the full height spaces that characterise the (arched) Cumberland Street and (flat) Middlemiss Street bays, which largely retain these internal spatial qualities. This approach does not preclude partial subdivision if well designed and detached from the walls and soffits so as to respect the spatial qualities of the bays.

- 23.1 The bays in the SHB approaches should continue to be available for a range of uses, including lease by appropriate businesses and organisations whose spatial and fitout requirements are compatible with the character of these spaces. The original reinforced concrete framed and steel framed glazing end walls to the bays should be retained with minimal alterations.
- 23.2 The design of fitouts (including the insertion of mezzanines and walls) to Middlemiss Street, Ennis Road (north side) and Cumberland Street (south side) bays should respond to

these large internal spaces. Internal subdivision of internal spaces is acceptable in principle; however, the voluminous nature of the internal spaces should be maintained by restricting the extent and height of subdivision. New mezzanine floors should not be attached to the walls of the bays, and the height of any new walls should allow uninterrupted views of the concrete vaults.

- 23.3 The minimum standards set out in the *Heritage Act* for the maintenance and repair of an item listed on the State Heritage Register (refer to the Heritage Amendment Regulation 2012 included as **Appendix J**), which apply to Transport for NSW (as owners of the SHB), should form part of the lease agreements for the commercial tenancies of the SHB, thereby requiring tenants to maintain their tenancy to an acceptable minimal standard.
- 23.4 External advertising associated with the leased areas of the approaches should comply with Policy 20 and be designed to fit within the basic modules of the end walls. Transport for NSW should prepare a template for signage to ensure a consistent and appropriate approach, and to ensure the heritage values of the SHB are maintained and respected. This template should consider signage located in the interior, on windows and external projecting signage from tenancies.

Policy 24 - Advertising

- 24.1 The SHB, including the arch, pylons, approach spans and approaches, should not be used for commercial advertising in any form including signage, projections or other media, except as follows:
 - Advertising associated with commercial tenancies as discussed in Policy 23.4

 Commercial sponsorship required to support the Sydney New Year's Eve 9pm Family and Midnight Fireworks Displays and Bridge Effects. Refer to Policy 21 and Site Specific Exemption 15 (Appendix E).

7.5.7 Management of movable heritage collection

Policy 25 - Movable items

Interpretation of significant machinery and equipment should include their roles in the SHB/workshop contexts, their operation and purpose. The role of these elements in representing the character and functions of former industrial workplaces, technologies and labour practices should also be integrated into the interpretation approach.

- 25.1 All original or early equipment or elements considered redundant or surplus to requirements and assessed to be of heritage significance should be suitably archived and recorded on the Transport for NSW's Section 170 Heritage and Conservation Register.
- 25.2 Management of equipment or elements of movable heritage should be undertaken with reference to the *SHB Movable Heritage Conservation Strategy 2007*, the Transport for NSW Heritage Guidelines and the SHB Interpretation Plan 2007.
- 25.3 The history and heritage significance of machinery and equipment specifically related to the SHB should be actively interpreted to the public.

Policy 26 - Collections management

26.1 Transport for NSW staff will refer to the Transport for NSW 'Movable Heritage Collection Policy Statement' and the 'Movable Heritage Collection Management Plan' contained in the Heritage Guidelines regarding the collection and management of movable heritage associated with the SHB.

- 26.2 Consideration should be given to the appointment of internal collection management staff to manage and coordinate the acquisition, curation, maintenance and conservation of the wide variety of SHB related material.
- 26.3 Collaborative opportunities should be investigated for curating artefacts associated with the SHB such as the exhibition curated by the Museum of Sydney with the assistance of Roads and Maritime (now Transport for NSW) to celebrate the 75th anniversary of the SHB.
- 26.4 Opportunities should be investigated for the management and curation of items that are acquired by, or donated to, Transport for NSW.

Policy 27 - Contents of pylons

- 27.1 Significant/original or early fixtures within the pylons, including staircases, balustrades, mezzanines and elevators, should be retained on site and conserved.
- 27.2 Significant/original or early maintenance equipment and workshop machinery should be retained in their historic (if not current) location. If machinery or equipment is required to be removed, relocated or altered for functional, safety or other specific reasons, the particular item(s) should be recorded in detail prior to the change.
- 27.3 If significant/original or early machinery, equipment or elements are considered redundant or surplus to requirement, an assessment should be made of their heritage significance (advice from a suitably qualified heritage practitioner may be required). If considered significant, the material must be considered as movable heritage and entered onto the Transport for NSW Section 170 Heritage and Conservation Register (see Policy 25).

- 27.4 Where machinery and equipment is considered redundant or surplus to requirements and removed from its original location, it should be considered for use as part of the interpretation of the SHB.
- 27.5 The existing 'Workshop space' in the interior of the pylons and its historic association with the maintenance of the SHB should be retained. Should the use of the workshop areas be discontinued, future uses should seek to minimise physical changes to the spaces and fabric.

Policy 28 - Contents of Milsons Point Station, Argyle Street substation and Switch house

28.1 Retain movable heritage items in situ and conserve as part of the ongoing asset management of the building, including safeguarding, annual inspection and periodic maintenance to ensure their conservation.

7.5.8 Archaeology

Policy 29 - Conservation of archaeological resources

The description of the archaeological resources within the curtilage of the SHB in Section 3.1.5 concludes that the construction of the SHB and the demolition that occurred in the Bradfield Park area at Milsons Point disturbed any potential subsurface remains relating to the previous Aboriginal and European occupations on the site. The archaeological excavations carried out at Dawes Point suggest that it is unlikely that additional archaeological potential remains would be present in that area, although the relics and the site itself should continue to be retained and conserved. Should archaeological relics be excavated within the CMP curtilage during works to the SHB, the archaeological provisions of the Heritage Act will apply, and Heritage NSW should be notified immediately.

29.1 The surviving archaeological resources of the area within the curtilage of the

CMP, particularly the remains of the Dawes Point Battery and associated material, should be conserved and managed in accordance with their cultural heritage values

- 29.2 Opportunities should be investigated and appropriate measures implemented to interpret to the public the archaeological resources of the area within the curtilage of the CMP.
- 29.3 Any subsurface disturbance of land that may have archaeological potential should be carried out in accordance with archaeological provisions of the *Heritage Act* and the Transport for *NSW Heritage Guidelines*.
- 29.4 In the event of archaeological investigations being carried out on land within the CMP curtilage, appropriate measures should be implemented to interpret the purpose, process and outcomes of the investigation to the public.

7.6 Public access, engagement and interpretation

7.6.1 Engagement with the public

Policy 30 - Engagement and interpretation

The importance of both current and historic circulation functions of the SHB, including roads, rail tracks, cycleways, tram route and pedestrian paths and stairs, should be interpreted for public users of the SHB.

- 30.1 The current circulation functions of the SHB, including roads, rail tracks, cycleways, and pedestrian paths and stairs, should be utilised where practicable to provide opportunities to interpret the history and cultural significance of the SHB to the public.
- 30.2 Entry/exit points for access to and across the SHB (particularly for pedestrian and cyclists) should be a focus for interpretation of both its tangible and intangible heritage values, including historic or other

associational links between different circulation routes and/or components.

- 30.3 Interpretation measures should inform public users of the SHB (particularly pedestrians and cyclists) of changes in its circulation functions since its opening in 1932, particularly the removal of the tram route and associated tunnels and other infrastructure.
- 30.4 Signs for visitor orientation (in The Rocks, Dawes Point and Milsons Point), visitor interpretation of the SHB and associated sites (eg where the opening ceremonies took place) should be developed with regard to the recommendations of the SHB Interpretation Plan 2007.
- 30.5 Opportunities for further active engagement with the public in regard to the SHB should be undertaken by Transport for NSW with reference to the *SHB Interpretation Plan 2007*, and with regard to the operational and security requirements of the SHB.
- 30.6 Regular user surveys should be undertaken to assess the effectiveness of visitor management, interpretation, and access and safety measures.

Policy 31 - Secondary tourism activities

Current secondary uses of the SHB include tourism and leisure based activities such as BridgeClimb Sydney, a venue for celebrations (Sydney New Year's Eve Welcome to Country, 9pm Family and Midnight Fireworks Displays and Bridge Effects) and a location for film and television productions. While public access and interpretation of the SHB should be encouraged and facilitated, alternate uses that adversely impact on the integrity of the original design, significant fabric or cultural values should not be permitted.

31.1 Opportunities for alternative tourism and interpretive initiatives such as BridgeClimb Sydney that complement and interpret, and do not adversely impact on the cultural and heritage values of the SHB as a whole should be investigated.

7.6.3 Interpretation

Policy 32 - Interpretation requirements

This policy identifies the fundamental need to implement the SHB Interpretation Plan through the development of site management and planning policies; and integrating interpretation concepts at an early stage during the preparation of detailed planning schemes or works proposals.

Because of the unique nature of the SHB, as well as its complexity and high heritage values, the SHB Interpretation Plan is of particular importance for its meaningful inclusion into site and management planning. Just as high standards of conservation, innovation, adaptation and construction are to be implemented (see Policy 18), active and innovative measures to interpret the site's past and heritage values provide an important measure of distinguishing and celebrating the SHB within both national and international contexts.

Methods of interpretation include conserving original features and fabric; reconstructing missing or damaged elements based on documentary and/or archaeological evidence; introducing interpretative devices such as discrete signage, the use of historic photographs, preserving evidence of original finishes, fitout (including equipment) and fabric; and allowing access for specialist study and/or presentation in publications, websites, podcasts, etc.

An interpretation action matrix is included in the SHB Interpretation Plan 2007, together with project partners and logistical advice.

- 32.1 Measures to appropriately interpret the significance of the SHB should be considered in conjunction with all future proposals for change and development.
- 32.2 The SHB Interpretation Plan 2007 should be referred to for guidance on how to interpret the heritage values of the SHB.

Policy 33 - Oral histories

Of particular importance is the implementation of a professional oral history program in relation to the SHB. Many former SHB workers will now be of an age where documenting their recollections is important. A substantial collection of oral histories on the SHB was undertaken by Richard Raxworthy. The collection was used by author Peter Lalor to write his book 'The Bridge', published by Allen and Urwin in 2005. The oral histories are now held in the State Library of NSW.

- 33.1 An ongoing oral history collection program for the SHB should be established in cooperation with the NSW State Library.
- 33.2 Publication opportunities with regard to the oral histories and social experiences of past SHB workers and operators should be explored.

7.7 Relationship to Commonwealth, State and local authorities

Policy 34 – Coordination of statutory compliance

The primary statutory instruments in this context refer to the:

- Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)
- Environmental Planning and Assessment Act 1979 (NSW)
- Heritage Act 1977 (NSW)
- Heritage Regulations 2012
- Roads Regulations 2018
- State Environmental Planning Policy (Infrastructure) 2007
- Environment SEPP (to be gazetted) (incorporating former Sydney Regional Environmental Plan (Sydney Harbour Catchment) 2005 (NSW))³

- Sydney Local Environmental Plan 2012
- North Sydney Local Environmental Plan 2013.
- 34.1 A range of individuals and organisations have an ongoing interest in the future heritage management of the SHB. Ongoing consultation with these is integral to effective heritage management of the site. The following must be consulted and involved in any proposal for the SHB or its broader context that have the potential to significantly impact on its heritage values.
 - Heritage agencies; for example, the Department of Agriculture, Water and the Environment (Clth); Heritage NSW and the NSW Department of Planning, Industry and Environment.
 - Affected landowners and managers of land within the heritage curtilage; for example, the City of Sydney Council, North Sydney Council, RailCorp and Property NSW.
 - Community organisations; for example, the National Trust of Australia (NSW), Engineers Australia, etc.
- 34.2 The policies of this CMP and associated management plans for the SHB should be coordinated with the relevant requirements and guidelines of statutory heritage instruments under which the SHB is listed. Potential areas of conflict between these documents which relate to conservation requirements/ imperatives should be subject to discussion/negotiation to ensure consistency in process and outcomes.

3. The SREP has been incorporated into a new Environment SEPP for the protection and management of the natural environment.

8.0 Implementation

8.1 Introduction

The conservation policies in Section 7.0 provide for the ongoing care and management of the SHB, so as to ensure the conservation of its diverse cultural heritage values. Effective policy implementation requires a range of strategies to be

Strategy 1

Finalisation and integration

To be implemented within three months of endorsement by Heritage Council of NSW

Transport for NSW, Heritage NSW, Department of Premier and Cabinet; Department of Planning, Industry and Environment (NSW) and the Department of the Agriculture, Water and the Environment (Clth), Australian Government, should formally adopt the endorsed Sydney Harbour Bridge Conservation Management Plan.

The CMP should be integrated with all other Transport for NSW documents, site planning and management processes related to ongoing care for the SHB. developed and put into place to provide the necessary link between particular policies and actual management actions.

In this final section of the CMP, four implementation strategies and their associated policies are identified to provide key management outcomes for the SHB.

Strategy 2

Statutory compliance

To be implemented within three months of endorsement by Heritage Council of NSW

A coordinated approach should be adopted by the Commonwealth (Department of Agriculture, Water and the Environment), State (Transport for NSW, Heritage NSW, Department of Premier and Cabinet, Property NSW) and local government authorities (North Sydney Council and the City of Sydney Council) to facilitate a coordinated approach to the statutory protection for the SHB.

Strategy 3

Conserve and maintain the place including key views

Immediate implementation

The cultural heritage values (including historic use, design integrity and fabric) of the SHB should be actively conserved by appropriate maintenance, repair and management of change as part of a program with both short and long-term strategies.

Strategy 4

Interpretation and public engagement

Within 12 months of implementation

The community should be provided with a wide range of opportunities to engage with the history and heritage of the SHB through a program of interpretation and public engagement.

1 Finalisation and integration

Transport for NSW, 'Heritage NSW, Department of Premier and Cabinet' (Heritage NSW); Department of Planning, Industry and Environment (NSW) and the Department of Agriculture, Water and the Environment (Clth), should formally adopt the endorsed Sydney Harbour Bridge Conservation Management Plan.

The CMP should be integrated with all other Transport for NSW documents, site planning and management processes related to ongoing care for the SHB.

Recommendations

- 1. The CMP would be adopted in principle by Transport for NSW and submitted to the Heritage Council for review and endorsement.
- 2. The CMP should be the first point of reference for both Transport for NSW and Sydney Trains (on behalf of RailCorp) in undertaking new works in regard to maintenance, repair or installation of new services and for scoping structural, accessibility or security upgrades to the SHB.
- 3. The CMP should be made available to Operations and Bridge Managers, as well as Asset Managers, lessees and tenants. The CMP should be readily accessible to all staff involved in working on the SHB or projects/decisions which affect it.
- 4. Appropriate training programs should be introduced to ensure all personnel working on the site are familiar with the role and contents of the CMP and can apply it to their particular work tasks.
- 5. All distributed copies of the CMP should be replaced when the document is reviewed and updated.

PoliciesPolicy 1 - Retention of cultural significancePolicy 8 - Excellence in heritage
managementPolicy 2 - Adoption of policiesPolicy 9 - Priority of cultural heritage valuePolicy 3 - Coordination with
management plansPolicy 9 - Priority of cultural heritage valuePolicy 4 - Distribution of the CMPPolicy 10 - Management responsibilities
and delegationsPolicy 5 - Monitoring and review of the CMPPolicy 17 - Description of intervention and

- Policy 6 Professional advice on policies
- Policy 7 Conformity with National and international conservation principles
- Policy 17 Records of intervention and maintenance
- Policy 34 Coordination of statutory compliance

Outcome

The general asset management and operational requirements of the SHB will be integrated with procedures for statutory approvals and conservation of cultural heritage values.

2 Statutory compliance

A coordinated approach should be adopted by the Commonwealth (Department of Agriculture, Water and the Environment), State (Heritage NSW, Property NSW) and local government authorities (North Sydney Council and the City of Sydney Council) to facilitate a coordinated approach to the statutory protection for the SHB.

Recommendations

- 1. All Transport for NSW documents and policies relevant to the management of the SHB and its heritage values should be reviewed and adjusted/amended as necessary to include specific references to the CMP and ensure alignment and mutually supportive aims, procedures and outcomes.
- 2. Transport for NSW, Sydney Trains and Property NSW should ensure that all works and development within the curtilage of the SHB are determined under the relevant provisions or exemptions contained in the *Environment Protection and Biodiversity* Conservation Act 1999, the Environmental Planning and Assessment Act 1979, the Heritage Act 1977 (NSW), the Property NSW Act 2006, and the Environment SEPP (yet to be gazetted).
- 3. Transport for NSW should work with relevant Commonwealth, State and local government authorities to ensure that all works and development within the setting of the SHB are determined under the provisions of the Environment Protection and Biodiversity Conservation Act 1999, the Environmental Planning and Assessment Act 1979, the Heritage Act 1977 (NSW), the Property NSW Act 2006, and the Environment SEPP (yet to be gazetted), as appropriate.
- 4. Transport for NSW should make transparent and digitise the process for demonstrating compliance with the CMP through an on-line workflow and approval process.

Policies

Outcome				
Policy 12 -	Maintaining key views of the Sydney Harbour Bridge in its Setting			
Policy 11 –	Management responsibilities and delegations		compliance	
	principles	Policy 34 -	- Coordination of statutory	
Policy 7 –	Conformity with National and international conservation	Policy 29 -	Conservation of archaeological resources	
Policy 5 -	Monitoring and review of the CMP	and change		
Policy 2 –	olicy 2 - Adoption of policies		Policy 18 - Management of adaptation	

The cultural heritage values of the SHB and its setting will be protected through the coordination of a range of statutory instruments implemented by national, state and local authorities.

3 Conserve and maintain the place including key views

The cultural heritage values (including historic use, design integrity and fabric) of the SHB should be actively conserved by appropriate maintenance, repair and the management of change as part of a program with both short and long-term strategies.

Recommendations

- The current program of maintenance and repair for the SHB should be continued but will require review to incorporate the recommendations of this CMP. Maintenance and repair work should conform to both the general and specific policies in Section 7.0 Conservation Policies and the Sydney Harbour Bridge Conservation Management Plan: Volume 2: Inventory Records document.
- 2. The review of the maintenance program should incorporate identified limitations, problem areas, new requirements and methods. A condition audit of site components and fabric and a review of responsibilities for implementation and oversight of maintenance works should occur at this time.
- 3. All proposals for intervention, adaptation and change to respond to changing operational requirements should be evaluated in terms of the nature of the proposal, its purpose, long-term context and how this relates to the identified cultural heritage values of the SHB by confirming compliance with the CMP. Protection and enhancement of the significant elements of the SHB through appropriate adaptation and change for new or additional necessary functions should be a key management goal.
- 4. Changes to the SHB due to its ongoing and historically significant function as the main road, rail, pedestrian and cycle connection across Sydney Harbour, in continuous use since 1932, should be given priority over changes determined by the needs of secondary uses such as tourism and recreation.
- 5. Transport for NSW should adopt a cooperative approach with other authorities, organisations and tenants who are users of the SHB to ensure that they are aware of their responsibilities and statutory obligations to respond to and work with the cultural heritage values of the SHB.
- Care of the SHB Movable Heritage Collection (which comprises the SHB Workshops Collection, the SHB Memorabilia Collection; and SHB Southeast Pylon Museum Collection) should be undertaken in accordance with the movable heritage conservation policies in section 7.5.7
- 7. The acquisition and management of movable heritage related to the SHB should be undertaken in accordance with the collections policy in the Transport for NSW Heritage Guidelines, managed by the Environment and Sustainability Branch, Safety, Environment and Regulation Division.
- 8. In the case of the excavation or disturbance of archaeological resources within the SHB curtilage, Transport for NSW should first refer to the *Transport for NSW Heritage Guidelines* and seek heritage advice, including an internal (Transport for NSW) or external archaeological expert.

3 Conserve and maintain the place including key views

Policies

- Policy 1 Retention of cultural significance
- Policy 2 Adoption of policies
- Policy 3 Coordination with management plans
- Policy 4 Distribution of the CMP
- Policy 7 Conformity with National and international conservation principles
- Policy 8 Excellence in heritage management
- Policy 9 Priority of cultural heritage value
- Policy 10 Management objectives
- Policy 11 Management responsibilities and delegations
- Policy 12 Maintaining key views of the Sydney Harbour Bridge in its setting
- Policy 13 Retention of existing open space for public use/recreation
- Policy 14 Integrity of original design

- Policy 16 Use appropriate specialist personnel change
- Policy 17 Records of intervention and maintenance
- Policy 18 Management of adaptation and change
- Policy 19 Lighting
- Policy 23 Use of approaches
- Policy 24 Advertising
- Policy 25 Movable items
- Policy 26 Collections management
- Policy 27 Contents of pylons
- Policy 28 Contents of Milsons Point Station, Argyle Street Substation and Switch House
- Policy 29 Conservation of archaeological resources
- Policy 34 Coordination of statutory compliance

Outcome

The conservation of the cultural heritage values of the SHB will be a priority of its management, maintenance and repair programs.

4 Interpretation and public engagement

The community should be provided with a wide range of opportunities to engage with the history and heritage of the SHB through a program of interpretation and public engagement.

Recommendations

- 1. The SHB Interpretation Plan 2007 should be formally adopted by Transport for NSW. Responsibility for implementation of the Interpretation Plan should be allocated to a specific position/role or section within Transport for NSW.
- 2. Implementation of the SHB Interpretation Plan 2007 should involve representatives from Transport for NSW and other stakeholders (eg Sydney Trains, the SHB Concessionaire, Heritage NSW, Heritage Council, Property NSW, North Sydney Council, the City of Sydney Council, The Rocks Walking Tours, Tourism Sydney and the Metropolitan Local Aboriginal Land Council).
- 3. Alterations to the SHB to provide enhanced accessibility, especially to the pedestrian walkway and cycle path, should be designed to avoid obscuring or adversely affecting the integrity of the original design, significant fabric or its heritage values.
- 4. Transport for NSW should monitor the frequency of requests for 'special uses of the SHB' such as banners, coloured lighting or projections, and manage these to avoid overuse.
- 5. Transport for NSW and Property NSW should cooperate to develop interpretive signs and other media which are consistent throughout the SHB and associated areas. Signs should be reviewed and upgraded and design standards developed for SHB signs and publications.
- 6. Transport for NSW should support a web-based heritage portal which will provide accurate and easily accessible resources for visitors, tour guides, teachers, students and others in relation to the SHB.
- 7. Transport for NSW should develop and produce a range of print and electronic media (eg brochures, posters and interactive media) to provide easily accessible introductory interpretation of the SHB. Information should be available on the web-based heritage portal, displayed in public transport or on or near the SHB.

Policies

Policy 3 - Coordination with management	Policy 27 - Contents of pylons			
plans Policy 10 - Management objectives	Policy 28 - Contents of Argyle Street substation and Switch house			
Policy 12 – Maintaining key views of	Policy 30 – Engagement and interpretation			
the Sydney Harbour Bridge	Policy 31 - Secondary tourism uses			
Policy 22 - Special uses of the Sydney	Policy 32 - Interpretation requirements			
Harbour Bridge	Policy 33 – Oral histories			
Policy 25 - Movable items				

Policy 26 - Collections management

Outcome

The cultural heritage values of SHB will be relayed to the public and community via a range of media.

Appendix A – Heritage Register Entries

National Heritage List

 Sydney Harbour Bridge, Bradfield Highway, Dawes Point - Milsons Point, NSW, Australia

https://www.environment.gov.au/cgi-bin/ ahdb/search.pl?mode=place_detail;place_ id=105888

State Heritage Register

• Argyle Cut (01523)

https://apps.environment.nsw.gov.au/ dpcheritageapp/ViewHeritageItemDetails. aspx?ID=5053138

• Argyle Street Railway Substation (01022)

https://apps.environment.nsw.gov.au/ dpcheritageapp/ViewHeritageItemDetails. aspx?ID=5045307

• Dawes Point Battery Remains (01543)

https://apps.environment.nsw.gov.au/ dpcheritageapp/ViewHeritageItemDetails. aspx?ID=5053114

• Millers Point and Dawes Point Village Precinct (01682)

https://apps.environment.nsw.gov.au/ dpcheritageapp/ViewHeritageItemDetails. aspx?ID=5054725

• Milsons Point Railway Station Group (01194)

https://apps.environment.nsw.gov.au/ dpcheritageapp/ViewHeritageItemDetails. aspx?ID=5012106

• Sydney Harbour Bridge, approaches and viaducts (road and rail) (00871)

https://apps.environment.nsw.gov.au/ dpcheritageapp/ViewHeritageItemDetails. aspx?ID=5045703

Property NSW S170 Register

 Cannon, Dawes Point Park (SHI# 4500491)

https://apps.environment.nsw.gov.au/ dpcheritageapp/ViewHeritageItemDetails. aspx?ID=4500491

• Dawes Point Battery Remains, Hickson Road, The Rocks (SHI No. 5053114)

https://apps.environment.nsw.gov.au/ dpcheritageapp/ViewHeritageItemDetails. aspx?ID=4500494

 Dawes Point Heritage Precinct, George St, Lower Fort St, Hickson Road & Harbour Promenade, The Rocks (SHI No. 4500497)

https://apps.environment.nsw.gov.au/ dpcheritageapp/ViewHeritageItemDetails. aspx?ID=4500497

• The Rocks Conservation Area, The Rocks (SHI No. 4500458)

https://apps.environment.nsw.gov.au/ dpcheritageapp/ViewHeritageItemDetails. aspx?ID=4500458

Railcorp s170 Heritage Register

Milsons Point (Fitzroy Street)
Underbridge (SHI No. 480822)

https://apps.environment.nsw.gov.au/ dpcheritageapp/ViewHeritageItemDetails. aspx?ID=4801822

• Milsons Point (Lavender Street) Underbridge (SHI No. 4801823)

https://apps.environment.nsw.gov.au/ dpcheritageapp/ViewHeritageItemDetails. aspx?ID=4801823
• North Sydney (Arthur Street) Underbridge (SHI No. 4801024)

https://apps.environment.nsw.gov.au/ dpcheritageapp/ViewHeritageItemDetails. aspx?ID=4801824

• Sydney Harbour Bridge (Rail Property Only) (SHI No. 4801059)

https://apps.environment.nsw.gov.au/ dpcheritageapp/ViewHeritageItemDetails. aspx?ID=4801059

 The Rocks (Argyle Street) Railway Substation and Switchhouse (SHI No. 4800006)

https://apps.environment.nsw.gov.au/ dpcheritageapp/ViewHeritageItemDetails. aspx?ID=4800006

• The Rocks (Argyle Street) Underbridge (SHI No. 4801821)

https://apps.environment.nsw.gov.au/ dpcheritageapp/ViewHeritageItemDetails. aspx?ID=4801821

• Wynyard Former Tram Tunnels (SHI No. 4800281).

https://apps.environment.nsw.gov.au/ dpcheritageapp/ViewHeritageItemDetails. aspx?ID=4800281

TfNSW s170 Heritage Register

• Sydney Harbour Bridge, approaches and viaducts (SHI 4301067)

https://apps.environment.nsw.gov.au/ dpcheritageapp/ViewHeritageItemDetails. aspx?ID=4301067

Transport for NSW Movable Heritage
 Collection (SHI 4311604)

https://apps.environment.nsw.gov.au/ dpcheritageapp/ViewHeritageItemDetails. aspx?ID=4311604

North Sydney Local Environmental Plan 2013

• Sydney Harbour Bridge North Pylons (Item 10541)

https://apps.environment.nsw.gov.au/ dpcheritageapp/ViewHeritageItemDetails. aspx?ID=2186356

 'Sydney Harbour Bridge approach viaducts, arches and bays under Warringah Freeway' (Item 10530)

https://apps.environment.nsw.gov.au/ dpcheritageapp/ViewHeritageItemDetails. aspx?ID=2180030

Sydney Local Environmental Plan 2012

 Sydney Harbour Bridge Approaches Group including pylons, pedestrian stairs and access roads (Schedule 5, Part 1: Item 1539)

https://apps.environment.nsw.gov.au/ dpcheritageapp/ViewHeritageItemDetails. aspx?ID=2426283

• Millers Point/Dawes Point Conservation Area (Schedule 5, Part 2: C35)

https://apps.environment.nsw.gov.au/ dpcheritageapp/ViewHeritageItemDetails. aspx?ID=2426306

Appendix B -

Sydney Harbour Bridge Precinct Plans









SOUTHERN APPROACHES

- RENDERED APPROACH STRUCTURES
 - RETAINING WALLS
- ARCH BRIDGE



Appendix C – Comparison of National Heritage and NSW Heritage Criteria

National Heritage Criteria

Criterion A (Historic)

The place has outstanding heritage value to the nation because of the place's importance in the course, or pattern, of Australia's natural or cultural history.

Criterion B (Rarity)

The place has outstanding heritage value to the nation because of the place's possession of uncommon, rare or endangered aspects of Australia's natural or cultural history.

Criterion C (Scientific)

The place has outstanding heritage value to the nation because of the place's potential to yield information that will contribute to an understanding of Australia's natural or cultural history.

Criterion D (Representativeness)

The place has outstanding heritage value to the nation because of the place's importance in demonstrating the principal characteristics of:

- (i) a class of Australia's natural or cultural places; or
- (ii) a class of Australia's natural or cultural environments.

Criterion E (Aesthetic Significance)

The place has outstanding heritage value to the nation because of the place's importance in exhibiting particular aesthetic characteristics valued by a community or cultural group.

Criterion F (Technical)

The place has outstanding heritage value to the nation because of the place's importance in demonstrating a high degree of creative or technical achievement at a particular period.

Criterion G (Social)

The place has outstanding heritage value to the nation because of the place's strong or special association with a particular community or cultural group for social, cultural or spiritual reasons.

New South Wales Heritage Criteria

Criterion (a) (Historic)

An item is important in the course, or pattern, of NSW's cultural or natural history.

Criterion (f) (Rarity)

An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history.

Criterion (e) (Research Potential)

An item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history.

Criterion (g) (Representativeness)

An item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places or cultural or natural environments.

Criterion (c) (Aesthetic)

An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW.

Criterion (c) (Technical)

An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW.

Criterion (d) (Social)

An item has strong or special association with a particular community or cultural group in NSW for social, cultural or spiritual reasons.

National Heritage Criteria

Criterion H (Associational)

The place has outstanding heritage value to the nation because of the place's special association with the life or works of a person, or group of persons, of importance in Australia's natural or cultural history.

Criterion I (Indigenous)

The place has outstanding heritage value to the nation because of the place's importance as part of Indigenous tradition.

New South Wales Heritage Criteria

Criterion (b) (Historic Association)

An item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history.

No corresponding State heritage criterion

Appendix D – Standard Exemptions for Works requiring Heritage Council Approval

• Schedule of Standard Exemptions to subsection 57(1) of the Heritage Act 1977 made under subsection 57(2)

https://www.heritage.nsw.gov.au/permits-and-approvals/state-heritage-items/standard-exemptions/

Appendix E – Sydney Harbour Bridge Specific Exemptions for Works requiring Heritage Council of NSW Approval

- 1. Maintenance and minor repairs necessary to preserve and maintain the functioning of the structure as a transport and services corridor, for example pavement resurfacing, track laying, electric catenary replacement, traffic management, toll collection and navigational infrastructure, and pipework and cabling;
- 2. Maintenance and minor repairs necessary to maintain the appearance and setting of the Bridge including cleaning, painting and reinstatement of original or replica architectural and decorative elements.
- 3. Minor works necessary to preserve and maintain the functioning of the Bridge, for example drainage modifications, modifications to road, rail, navigational, traffic management and toll collection and other infrastructure;
- Minor works necessary to preserve and maintain the functioning of utility supply and communications, for example modifications and improvements to power supply systems, communications cabling and water supply systems including fire hydrants;
- Minor works necessary to preserve and enhance the security of the Bridge such as security fencing, video surveillance and detection systems;
- Minor works necessary to upgrade and enhance the structural integrity of the Bridge that do not alter its overall form or shape or significantly change the appearance of bridge elements;
- Minor works internal to the Bridge structure or structural members that do not physically change the external appearance of the Bridge or bridge members;

- Temporary works including containment areas, scaffolding and enclosures necessary for the carrying out of maintenance, enhancement or upgrading works;
- Minor internal and external changes to office spaces, retail and other tenancy spaces and recreational facilities;
- Installation of safety or information signs, not being for commercial or advertising purposes;
- Temporary and reversible works for the operation of special events;
- 12. Maintenance of roadways, footpaths, parklands and vegetation;
- Minor subdivision in terms of State Environmental Planning Policy No. 4;
- 14. Change of use from approved use to a similar permissible use;
- 15. Display of names and/or logos of relevant New Year's Eve sponsors and partners below the Juliette balconies of the pylons and only during the Sydney New Year's 9PM and Midnight Fireworks Display event.
- 16. Works that in the opinion of the Executive Director of Heritage NSW, Department of Premier and Cabinet, are required for the security of the Bridge and bridge users, and that need to remain confidential.

Appendix F – Sydney Harbour Bridge Conservation Management Plan Compliance Checklist

This checklist is to be completed for any works requiring a s60 approval or s57 endorsement. This checklist must be submitted to the Sydney Harbour Bridge asset manager when seeking landowner signature on s60 and/or s57 forms.

Sydney Harbour Bridge Conservation Management Plan Compliance Checklist - Template
Compliance Checklist

Sydney Harbour Bridge CMP Compliance Checklist

report such as a 'statement of heritage impact' (SoHI). Ideally, this checklist would be completed by a heritage practitioner and appended to any technical heritage (as a minimum) for any works requiring a s57 endorsement or a s60 approval under the Heritage Act 1977. This Sydney Harbour Bridge Conservation Management Plan (CMP) compliance checklist must be completed

This checklist includes the 34 CMP policies (and sub-policies) which aim to ensure the Sydney Harbour Bridge (SHB) is managed and conserved in accordance with its heritage values. The column on the left summarises the policies contained in the CMP. It is recommended that the person completing the form refers to the full policies contained in the CMP for accuracy and completeness.

technical report has been prepared, such as a SoHI, you may refer to the relevant section of that report including the chapter, section and page number. The person completing the form should briefly state in the right column how the proposed works comply (or do not comply) with each policy. Where a

It should be noted that not all policies will be relevant to all types of works. Where this is the case, please insert N/A adjacent to the particular policy

with the CMP The person completing the form is required to make a statement at the end of this checklist confirming how the proposed works comply (or do not comply)

Project name:	Insert name of proposal
Proponent:	Insert name and contact details of Proponent/Project Manager
SOHI reference:	Insert title of associated heritage assessment, such as a statement of heritage impact

Polic	1.6	1. 5	1. 4	1.3	1.2		Polic	SHB
y 2 – Adoption of policies	Ensure appropriate security, maintenance and management of the SHB is carried out to protect the SHB.	Explore alternative options to reduce heritage impacts before a preferred option is agreed on.	Conservation of the SHB should accord with the principles of The Burra Charter.	Owners, managers and consent authorities are jointly responsible for the conservation of the SHB.	Retain significant elements of the SHB as a priority.	Conserve the cultural significance of the SHB.	y 1 – Retention of cultural significance	CMP Policy
	For office use – on-going	Insert 'W', 'M', 'S', X' or 'N/A'	For office use – completed by Safety, Environment and Regulatory Division, TfNSW	For office use – on-going	Insert 'W', 'M', 'S', 'X' or 'N/A'	For office use – on-going		Compliance (as per ISO 16355-1) Choose from Weak (W), Moderate (M), Strong (S), Extremely Strong (X) or Not Applicable (N/A)
		Insert response			Insert response			Describe how compliance is achieved if Strong (S) or Extremely Strong (X) OR describe remediation measures if compliance is Weak (W) or Moderate (M)

SHB CMP Policy	Compliance (as per ISO 16355-1) Choose from Weak (W), Moderate (M), Strong (S), Extremely Strong (X) or Not Applicable (N/A)	Describe how compliance is achieved if Strong (S) or Extremely Strong (X) OR describe remediation measures if compliance is Weak (W) or Moderate (M)
2.1 TfNSW should adopt the SHB CMP policies as a guide to conservation.	For office use – in progress	
2.2 Heritage Council should endorse the SHB CMP	For office use – in progress	
Policy 3 – Coordination with management plans		
3.1 Check the SHB CMP against any associated management plans for consistency	For office use – completed by Safety, Environment and Regulatory Division, TfNSW	
Policy 4 – Distribution of the CMP		
4.1 Lodge copies of the CMP with key agencies.	For office use – in progress	
4.2 Copies of the CMP should be held by TfNSW and Sydney Trains and referenced on relevant heritage listing	For office use – in progress	
4.3 Make copies of the CMP available to City of Sydney and North Sydney.	For office use – in progress	
Policy 5 – Monitoring and review of the CMP		

Polic	б. З	6.2	6.1	Polic	5. 1	SHB
cy 7 – Conformity with National and interna	Seek advice from external (non-TfNSW) heritage practitioner(s) when seeking to apply for s60 approval under the <i>Heritage Act</i> .	Seek advice from heritage practitioner(s) when carrying out a controlled activity under s57(1) of the <i>Heritage Act</i> (excluding activities covered by site specific exemption(s) and certain standard exemptions).	Seek advice from heritage practitioners when reviewing, updating or amending CMP policies	cy 6 – Professional heritage advice	CMP to be reviewed every five years	CMP Policy
tional conservation principles	Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'	For office use – completed by Safety, Environment and Regulatory Division, TfNSW		For office use – completed by Safety, Environment and Regulatory Division, TfNSW	Compliance (as per ISO 16355-1) Choose from Weak (W), Moderate (M), Strong (S), Extremely Strong (X) or Not Applicable (N/A)
	Insert response	Insert response				Describe how compliance is achieved if Strong (S) or Extremely Strong (X) OR describe remediation measures if compliance is Weak (W) or Moderate (M)

Policy 11 – Management responsibilities and de	10.1 Management the SHB to retain and interpret its cultural values; conserve significant elements; maintain its transport role; and maintain its connections with harbour side elements.	Policy 10 – Policy 10 – Management objectives	9.1 Understand what actions are likely to affect the cultural values of the SHB and manage these appropriately to minimise their impact.	Policy 9 – Policy 9 – Priority of cultural heritage	8.1 The SHB should set a national benchmark in excellence for conservation management.	Policy 8 – Excellence in heritage management	7.1 The conservation of the SHB should primarily accord with the CMP, and then any nationally and internationally recognised conservation principles.	SHB CMP Policy
egations	Insert 'W', 'M', 'S', 'X' or 'N/A'		Insert 'W', 'M', 'S', 'X' or 'N/A'	· value	Insert 'W', 'M', 'S', 'X' or 'N/A'		For office use – completed by Safety, Environment and Regulatory Division, TfNSW	Compliance (as per ISO 16355-1) Choose from Weak (W), Moderate (M), Strong (S), Extremely Strong (X) or Not Applicable (N/A)
	Insert response		Insert response		Insert response			Describe how compliance is achieved if Strong (S) or Extremely Strong (X) OR describe remediation measures if compliance is Weak (W) or Moderate (M)

12.3	12.2	12.1	Polic	11.3	11.2	11.1	SHB
Ensure new structures or plantings on the harbour foreshores do not obscure the form or setting of the SHB.	Retain views and vistas to and from the SHB.	Conserve the physical and visual character of the SHB within its harbour setting.	y 12 – Maintaining key views of the SHB in	The SHB asset manager is the appropriate delegate to sign as TfNSW landowner on s57 and s60 forms required for works affecting the SHB.	The SHB asset manager is responsible for ensuring any works on the SHB are compliant with the CMP.	TfNSW will appoint a key SHB asset manager.	CMP Policy
Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'	its setting	For office use – the compliance checklist will be issued to Director Sydney Asset (or their delegate) when seeking TfNSW landowner signature on s57 and s60 forms.	For office use – this compliance checklist will be issued to Director Sydney Asset (or their delegate) for endorsement.	For office use – the Director Sydney Asset (or their delegate) is the nominal asset manager for the SHB.	Compliance (as per ISO 16355-1) Choose from Weak (W), Moderate (M), Strong (S), Extremely Strong (X) or Not Applicable (N/A)
Insert response	Insert response	Insert response					Describe how compliance is achieved if Strong (S) or Extremely Strong (X) OR describe remediation measures if compliance is Weak (W) or Moderate (M)

14.2 Maintain views of the structural form of the granite pylons and approach span piers. Any new uses should be accommodated within these elements.	14.1 Maintain views of the structural form of the SHB and its elements from key points around the harbour.	Policy 14 – Integrity of original design	13.2 Ensure future management of the SHB precinct retains its open character and space, and historic viewing areas.	13.1 Ensure parklands adjacent to the SHB remain open to the public for passive recreation and allow unimpeded views to the SHB.	Policy 13 – Retention of existing open space fo	12.4 Ensure new structures or plantings do not obscure or detract from the views of Sydney Harbour and the city from the SHB.	SHB CMP Policy	
Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'		Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'	or public use/recreation	Insert 'W', 'M', 'S', 'X' or 'N/A'	Compliance (as per ISO 16355-1) Choose from Weak (W), Moderate (M), Strong (S), Extremely Strong (X) or Not Applicable (N/A)	
Insert response	Insert response		Insert response	Insert response		Insert response	Describe how compliance is achieved if Strong (S) or Extremely Strong (X) OR describe remediation measures if compliance is Weak (W) or Moderate (M)	

15.1 Carry out regular maintenance and minor works to ensure the functional and structural integrity of the SHB is retained. That is, "do as much as necessary but as little as possible".	Policy 15 – Maintenance and minor works gene	14.6 Restore or recreate original design elements that contribute to the heritage value of the SHB, and minimise the introduction of distracting elements.	14.5 Conserve the voluminous open spaces in the pylons and approaches.	14.4 Conserve significant original design or functional elements such as cast-iron railings, steel window frames, lighting, etc.	14.3 Conserve the fabric and design integrity of the main components of the SHB including the arch, hangers, roadway, pylons, approach spans, etc.	SHB CMP Policy
For office use – Responsibility of TfNSW Sydney Planning Team and Sydney Maintenance Team.	rally	Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'	Compliance (as per ISO 16355-1) Choose from Weak (W), Moderate (M), Strong (S), Extremely Strong (X) or Not Applicable (N/A)
		Insert response	Insert response	Insert response	Insert response	Describe how compliance is achieved if Strong (S) or Extremely Strong (X) OR describe remediation measures if compliance is Weak (W) or Moderate (M)

be carried out by people with proven expertise in the relevant field and under adequate supervision.	Policy 16 – Use appropriate specialist personn	15.5 Regularly review, and update the Standard or Specific Exemptions under s 57(2) of the <i>Heritage Act</i> .	15.4 Regularly inspect and maintain all machinery, equipment and other movable elements.	15.3 Use the SHB CMP Inventory Records (CMP Vol 2) and SHB Asset Register to assist with ongoing maintenance and repair.	15.2 Prepare and regularly revise a maintenance program for the SHB.	SHB CMP Policy
Insert W, M, S, X OF N/A	<u>₽</u>	For office use – Responsibility of Safety, Environment and Regulatory Division, TfNSW	For office use – Responsibility of TfNSW Sydney Planning Team and Sydney Maintenance Team.	For office use – Responsibility of TfNSW Sydney Planning Team and Sydney Maintenance Team.	For office use – Responsibility of TfNSW Sydney Planning Team and Sydney Maintenance Team.	Compliance (as per ISO 16355-1) Choose from Weak (W), Moderate (M), Strong (S), Extremely Strong (X) or Not Applicable (N/A)
insert response						Describe how compliance is achieved if Strong (S) or Extremely Strong (X) OR describe remediation measures if compliance is Weak (W) or Moderate (M)

Policy 18 – Management of adaptation and chang	17.2 Document conservation works and include the purpose of the works, the method and monitoring.	17.1 Document works carried out on the SHB and ensure this is appropriately kept on file.	Policy 17 – Records of intervention and maintena	16.4 Retain and maintain significant fabric <i>in situ,</i> and in its current state and form where feasible.	16.3 An industrial archaeologist or specialist heritage practitioner should provide technical advice on the heritage value of machinery and equipment.	16.2 A conservation specialist should be involved in developing and evaluating new methods of repair work affecting significant/original fabric.	SHB CMP Policy
ge	Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'	ance	Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'	Compliance (as per ISO 16355-1) Choose from Weak (W), Moderate (M), Strong (S), Extremely Strong (X) or Not Applicable (N/A)
	Insert response	Insert response		Insert response	Insert response	Insert response	Describe how compliance is achieved if Strong (S) or Extremely Strong (X) OR describe remediation measures if compliance is Weak (W) or Moderate (M)

18.5	18.4	18.3	18.2	18.1	SHB
New work must facilitate the continuation of the transport function of the	Minimise adverse impacts on the heritage values of the SHB by exercising caution and reviewing the imperatives for new work; examining alterative solutions with lesser impacts; ensuring changes are reversible (where possible); and ensuring change is restricted to areas/fabric with a higher tolerance for change.	Minimise the physical impacts on the SHB, even when change is required to satisfy operational requirements.	Prioritise adaptation and change required by operational requirements over changes required for secondary uses such as tourism or recreation.	Protect and enhance significant elements of the SHB through appropriate adaptation and change resulting from operational requirements.	CMP Policy
Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'	Compliance (as per ISO 16355-1) Choose from Weak (W), Moderate (M), Strong (S), Extremely Strong (X) or Not Applicable (N/A)
Insert response	Insert response	Insert response	Insert response	Insert response	Describe how compliance is achieved if Strong (S) or Extremely Strong (X) OR describe remediation measures if compliance is Weak (W) or Moderate (M)

Policy 19 – Lighting	18.11 Ensure new work can be identifiable as 'new work' in accordance with Article 22.2 of the Burra Charter.	18.10 Avoid fixing services to external granite or rendered concrete surfaces	18.9 Ensure the attachment of services to steelwork is minimised and located as unobtrusively as possible.	18.8 Ensure new services are as unobtrusive as possible, and ensure redundant services are recorded before being removed.	18.7 Determine whether proposals affecting the SHB are compatible with the heritage values and historic use of the SHB.	18.6 SHB without obscuring or adversely affecting the integrity of the original design, significant fabric or its heritage values.	SHB CMP Policy
	Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'	Compliance (as per ISO 16355-1) Choose from Weak (W), Moderate (M), Strong (S), Extremely Strong (X) or Not Applicable (N/A)
	Insert response	Insert response	Insert response	Insert response	Insert response	Insert response	Describe how compliance is achieved if Strong (S) or Extremely Strong (X) OR describe remediation measures if compliance is Weak (W) or Moderate (M)

Compliance (as per ISO 16355-1) Describe how com Choose from Weak (W), Moderate (M), if Strong (S) or Ext Strong (S), Extremely Strong (X) or OR describe reme Not Applicable (N/A) compliance is Wea	9.1 Retain, conserve and use (where Insert 'W', 'M', 'S', 'X' or 'N/A' Insert response possible) original SHB lighting.	19.2 Ensure the design and installation of new Insert 'W', 'M', 'S', 'X' or 'N/A' Insert response light fittings complement the design character of the SHB and are reversible (where possible).	19.3 Restore or replicate original SHB lighting Insert 'W', 'M', 'S', 'X' or 'N/A' Insert response design elements (where possible) and avoid introducing distracting elements.	Policy 20 – Traffic, safety and directional signage	20.1 Minimise the visual impact of signage Insert 'W', 'M', 'S', 'X' or 'N/A' Insert response on the SHB by adhering to a coordinated approach.	20.2 Retain historic signs <i>in situ</i> (where Insert 'W', 'M', 'S', 'X' or 'N/A' Insert response	possible) or conserve them for interpretative purposes.
nce (as per ISO 16355-1) from Weak (W), Moderate (M), S), Extremely Strong (X) or OR describe remediation m Si, Extremely Strong (X) or Compliance is Weak (W) or	', 'M', 'S', 'X' or 'N/A' Insert response	', 'M', 'S', 'X' or 'N/A' Insert response	', 'M', 'S', 'X' or 'N/A' Insert response		', 'M', 'S', 'X' or 'N/A' Insert response	', 'M', 'S', 'X' or 'N/A'	', 'M', 'S', 'X' or 'N/A'

22.1 Written permission from TfNSW SHB Asset Manager is required for non- operational uses of the SHB.	Policy 22 – Special uses of the SHB	21.3 Ensure sponsor's names are only projected in black and white, and located below the balcony level of the pylons.	21.2 Ensure the scope of works for New Year's Eve displays, projections and fireworks is in accordance with the TfNSW and City of Sydney MOU.	21.1 Allow the SHB to be used for displays, projections and fireworks associated with New Year's Eve celebrations.	Policy 21 – Sydney New Year's Eve Welcome to	20.4 Ensure all signage conforms to Work Health and Safety requirements.	SHB CMP Policy
Insert 'W', 'M', 'S', 'X' or 'N/A'		Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'	o Country, 9pm Family and Midnight Fireworks I	Insert 'W', 'M', 'S', 'X' or 'N/A'	Compliance (as per ISO 16355-1) Choose from Weak (W), Moderate (M), Strong (S), Extremely Strong (X) or Not Applicable (N/A)
Insert response		Insert response	Insert response	Insert response	Displays and Bridge Effects	Insert response	Describe how compliance is achieved if Strong (S) or Extremely Strong (X) OR describe remediation measures if compliance is Weak (W) or Moderate (M)

23.3 Commercial tenants of the bays are to maintain their premises to an acceptable minimum standard as required by their lease agreement with TfNSW.	23.2 Retain the voluminous nature of the bays by restricting height subdivision.	23.1 Continue to allow the bays in the SHB approaches to be leased out by businesses and organisations.	Policy 23 – Use of approaches	22.3 Proposals that constitute advertising are not permitted.	22.2 Special uses of the SHB are not permitted where they: impact on the physical or visual integrity of the SHB or key views to and from the SHB; are incompatible with the transport function of the SHB or compromise its security; do not meet the standard of a State significant event.	SHB CMP Policy
Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'		Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'	Compliance (as per ISO 16355-1) Choose from Weak (W), Moderate (M), Strong (S), Extremely Strong (X) or Not Applicable (N/A)
Insert response	Insert response	Insert response		Insert response	Insert response	Describe how compliance is achieved if Strong (S) or Extremely Strong (X) OR describe remediation measures if compliance is Weak (W) or Moderate (M)

25.3 Actively interpret the history and heritage significance of SHB machinery and equipment	25.2 Manage SHB movable heritage with reference to the SHB Movable Heritage Conservation Strategy, TfNSW Heritage Guidelines and SHB Interpretation Plan.	25.1 Archive all original equipment or elements of significance that are now redundant and record them on TfNSW s170 Register.	Policy 25 – Movable items	24.1 Advertising is not to be permitted on the SHB except where associated with the commercial tenancies (Policy 23) or commercial sponsorship for NYE (Policy 21)	Policy 24 – Advertising	23.4 External advertising should comply with Policy 20 and a SHB signage template (where available).	SHB CMP Policy	
Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'		Insert 'W', 'M', 'S', 'X' or 'N/A'		Insert 'W', 'M', 'S', 'X' or 'N/A'	Compliance (as per ISO 16355-1) Choose from Weak (W), Moderate (M), Strong (S), Extremely Strong (X) or Not Applicable (N/A)	
Insert response	Insert response	Insert response		Insert response		Insert response	Describe how compliance is achieved if Strong (S) or Extremely Strong (X) OR describe remediation measures if compliance is Weak (W) or Moderate (M)	

27.1 – Retain and conserve significant early fixtures within the pylons on site.	Policy 27 – Content of pylons	26.4 Investigate opportunities to curate SHB movable heritage that is acquired by ordonated to TfNSW.	26.3 Investigate collaborative opportunities to curate SHB movable heritage.	26.2 Consider the appointment of internal collection management staff to manage SHB movable heritage.	26.1 TfNSW staff will refer to the TfNSW Movable Heritage Collections Policy Statement and Movable Heritage Collection Management Plan (in the TfNSW Heritage Guidelines) regarding the collection of SHB movable heritage.	Policy 26 – Collections management	SHB CMP Policy
Insert 'W', 'M', 'S', 'X' or 'N/A'		Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'	For office use - responsibility of TfNSW – In progress	Insert 'W', 'M', 'S', 'X' or 'N/A'		Compliance (as per ISO 16355-1) Choose from Weak (W), Moderate (M), Strong (S), Extremely Strong (X) or Not Applicable (N/A)
Insert response		Insert response	Insert response		Insert response		Describe how compliance is achieved if Strong (S) or Extremely Strong (X) OR describe remediation measures if compliance is Weak (W) or Moderate (M)

management of the buildings.	28.1 Retain and conserve movable heritage Insert 'W', 'M', 'S', 'X' or 'N/A' items <i>in situ</i> as part of the oppoint asset	Policy 28 – Contents of Milsons Point Station, Argyle Street substation and switc	27.4 Retain the 'workshop space' in Insert 'W', 'M', 'S', 'X' or 'N/A' the pylons.	27.3 Consider using redundant or surplus Insert 'W', 'M', 'S', 'X' or 'N/A' machinery or equipment for the interpretation of the SHB.	27.2 Assess redundant or surplus machinery, Insert 'W', 'M', 'S', 'X' or 'N/A' equipment or elements prior to their removal, and if significant, enter them on TfNSW's 170 Register.	27.1 Retain significant early maintenance equipment and machinery in their historic location (where possible). Where such equipment or machinery needs to be moved or altered, it should be recorded in detail.	Compliance (as per ISO 16355-1 Choose from Weak (W), Modera Strong (S), Extremely Strong (X Not Applicable (N/A)	
	Insert response	iouse.	Insert response	Insert response	Insert response	Insert response	Describe how compliance is achieved M), if Strong (S) or Extremely Strong (X) OR describe remediation measures if compliance is Weak (W) or Moderate (M)	

30.2	30.1	Polic	29.4	29.3	29.2	29.1	SHB
Consider interpretation opportunities at the entry and exit points of the SHB that target pedestrians and cyclists.	Consider using the circulation functions of the SHB (roads, rail, cycleways, pedestrian paths, stairs, etc) for interpretation opportunities.	y 30 – Engagement and interpretation	Interpret archaeological investigations and their outcomes to the public.	Ensure the relics provision of the <i>Heritage Act</i> are appropriately addressed, along with any provisions in the TfNSW Heritage Guidelines.	Investigate measures to interpret the archaeological resources of the SHB precinct	Conserve and manage the archaeological resources within the SHB precinct, particularly Dawes Point Battery.	CMP Policy
Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'		Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'	Compliance (as per ISO 16355-1) Choose from Weak (W), Moderate (M), Strong (S), Extremely Strong (X) or Not Applicable (N/A)
Insert response	Insert response		Insert response	Insert response	Insert response	Insert response	Describe how compliance is achieved if Strong (S) or Extremely Strong (X) OR describe remediation measures if compliance is Weak (W) or Moderate (M)

Insert 'W', 'M', 'S', 'X' or 'N/A' Insert response	Insert 'W', 'M', 'S', 'X' or 'N/A'		tive Insert 'W', 'M', 'S', 'X' or 'N/A' Insert response ; that
'W', 'M', 'S', 'X' or 'N/A' Insert response	W/ W (S) (Y) or (N/A)		·W, W, S, X or W/A

34.1 Consult with key government agenc on proposals likely to significantly af the heritage significance of the SHB	Policy 34 – Coordination of statutory cc	33.2 Explore opportunities to publish oral histories and social experiences of past SHB workers.	33.1 Establish an ongoing oral history collection of the SHB in cooperation with the NW State Library	Policy 33 – Oral histories	32.2 Refer to the SHB Interpretation Plan for guidance on how to interpret heritage values	32.1 Consider measures to interpret the SHB in all future proposals for change and development.	SHB CMP Policy
es Insert 'W', 'M', 'S', 'X' or 'N/A' fect	mpliance	Insert 'W', 'M', 'S', 'X' or 'N/A'	For office use – responsibility of TfNSW Safety, Environment and Regulatory Division.		Insert 'W', 'M', 'S', 'X' or 'N/A'	Insert 'W', 'M', 'S', 'X' or 'N/A'	Compliance (as per ISO 16355-1) Choose from Weak (W), Moderate (M), Strong (S), Extremely Strong (X) or Not Applicable (N/A)
Insert response		Insert response			Insert response	Insert response	Describe how compliance is achieved if Strong (S) or Extremely Strong (X) OR describe remediation measures if compliance is Weak (W) or Moderate (M)

I <mark>[Insert name of Heritage Practitioner]</mark> of <mark>[insert nam</mark> they generally comply with the Sydney Harbour Brid	34.2 Ensure the SHB CMP policies align with relevant requirements and guidelines of statutory instruments under which the SHB is listed.	SHB CMP Policy
<mark>ne of organisation including contact details]</mark> have a ge Conservation Management Plan (2020).	For office use – responsibility of TfNSW Safety, Environment and Regulatory Division.	Compliance (as per ISO 16355-1) Choose from Weak (W), Moderate (M), Strong (S), Extremely Strong (X) or Not Applicable (N/A)
ssessed the proposed works and determined that		Describe how compliance is achieved if Strong (S) or Extremely Strong (X) OR describe remediation measures if compliance is Weak (W) or Moderate (M)

Signature of Heritage Practitioner

Appendix G – EPBC Act Compliance Checklist

EPBC Act Compliance Checklist

The Sydney Harbour Bridge is listed on the NSW State Heritage Register. This updated Conservation Management Plan has been prepared with regard to the methodology outlined in the NSW Heritage Manual guidelines for the preparation of Conservation Management Plans (NSW Department of Urban Affairs and Planning and the Heritage Council of NSW, November 1996, as amended July 2002) and the guidelines of The Burra Charter: The Australia ICOMOS Charter for the Places of Cultural Significance 2013 in order to provide conservation policies and principles for the ongoing management and maintenance of the Sydney Harbour Bridge.

The Sydney Harbour Bridge has also been listed on the National Heritage List by the Australian Heritage Council. Consequently, the CMP has been prepared in order to obtain the endorsement of the Heritage Division, Office of Environment and Heritage (NSW) in regard to the conservation of a State significant item, as well as fulfilling the requirements for a Management Plan contained in the Environment Protection and Biodiversity Conservation Act 1999 (Cwlth) and the Environment Protection and Biodiversity Conservation Regulations 2000 (Cwlth).

Regulation 10.01C

Regulation 10.01C of the Regulations states that:

A plan for a National Heritage place, made under section 324S of the Act, must address the matters set out in Schedule 5A.

The following table lists the requirements contained in Schedule 5A and the relevant sections of the Management Plan that address each listed item.

Schedule 5A: A management plan must:	Report Section
Establish objectives for the identification, protection, conservation, presentation and transmission of the National Heritage values of the place;	Section 7.0
Provide a management framework that includes reference to any statutory requirements and agency mechanisms for the protection of the National Heritage values of the place;	Section 8.0
Provide a comprehensive description of the place, including information about its location, physical features, condition, historical context and current uses;	Section 2.0, 3.0 and 5.0
Provide a description of the National Heritage values and any other heritage values of the place;	Section 4.0
Describe the condition of the National Heritage values of the place;	Section 3.0
Describe the method used to assess the National Heritage values of the place;	Section 4.0
	Schedule 5A: A management plan must: Establish objectives for the identification, protection, conservation, presentation and transmission of the National Heritage values of the place; Provide a management framework that includes reference to any statutory requirements and agency mechanisms for the protection of the National Heritage values of the place; Provide a comprehensive description of the place, including information about its location, physical features, condition, historical context and current uses; Provide a description of the National Heritage values and any other heritage values of the place; Describe the condition of the National Heritage values of the place;

Schedule 5A: Management Plans for National Heritage Places

Regulation Reference	Schedule 5A: A management plan must:	Report Section
Schedule 5A (g)	Describe the current management requirements and goals, including proposals for change and any potential pressures on the National Heritage values of the place;	Section 6.0
Schedule 5A (h)	Has policies to manage the National Heritage values of the place, and include in those policies, guidance in relation to the following:	Section 7.0
	 the management and conservation processes to be used; 	Section 7.0
	the access and security arrangements, including access to the area for indigenous people to maintain cultural traditions;	Section 7.0
	iii) the stakeholder and community consultation and liaison arrangements;	Section 7.0
	iv) the policies and protocols to ensure that indigenous people participate in the management process;	Section 7.0
	v) the protocols for the management of sensitive information	Section 7.0
	vi) planning and managing of works, development, adaptive reuse and property divestment proposals;	Section 7.0
	vii) how unforeseen discoveries or disturbing heritage values is to be managed;	Section 7.0
	viii) how, and under what circumstances, heritage advice is to be obtained;	Section 7.0
	ix) how the condition of National Heritage values is to be monitored and reported;	Section 7.0
	 how the records of intervention and maintenance of a heritage place's register are kept; 	Section 7.0
	xi) research, training and resources needed to improve management;	Section 7.0
	xii) how heritage values are to be interpreted and promoted;	Section 7.0
Schedule 5A (i)	Include an implementation plan;	Section 8.0
Schedule 5A (j)	Show how the implementation of policies will be monitored;	Section 8.0
Schedule 5A (k)	Show how the management plan will be reviewed	Section 8.0

Appendix H – Sydney Harbour Bridge: The Social Side

The following text examines the social values of the bridge, and has been extracted from Section 2.5 of the 1998 CMP.

Working on the Bridge

Alf Shields worked in the Milsons Point light workshop and he remembered a few incidents when he worked with a dogman named Frenchie.

Yes, there was one occasion when we had a girder to turn around for the Drillers. It had been drilled and our job was to turn it right over so that the reaming job that was done by the Drillers would take all the rough edges off the holes. On one occasion the hoist started working and my hands were underneath the chains and tightening up all the time. And as I looked over to Frenchie - I didn't call out to him but he saw apparently, just in time a look of fear in my eyes and he immediately blew his whistle and the ropes - the chain slackened. And I found that my hands although you could see that they'd been trapped, they were not hurt. Just really superficially bruised and I was very very thankful and I have always thought of that, that this man called Frenchie was probably the most alert dogman that I would ever hope to bump against.

Bert Payne, chargehand marker-off, told the secret of the accuracy on the Bridge.

Well as the men working for me marked the holes in the various angles and plates it was my responsibility to check them. Check every hole that they marked before the angles and plates were sent to the Drillers and I can virtually cross the bridge today and suggest that I've had my ruler on every one of the holes that those rivets fill up.

Bert Payne also remembered the communication skills of the Dorman Long Foreman, Alf Muttit.

Alf was a very fine fellow and I had quite a rapport with him. He was a north of England fellow - came over for Dorman and Long's - and I had quite a happy association with him, naturally he was in control of the whole workshops. I remember one particular feature of Alf, he made sure we understood what he said because, making a statement to it he would always qualify it by saying 'My meaning is' and repeat it, made sure we all got the right message.

Jack Edwards, assembly boilermaker, worked on the second shift in the Milsons Point Workshops.

What used to impress me was the size of the members. We had two big overhead travelling cranes that had a capacity of a hundred and twenty ton each and they would pick these members up that you see on the bridge now and they look tremendously bigger than what they look when they are out there on the site. But you'd see the two cranes, one at each end of a member and lift it up and carry it up from one end of the shop to the other. It was a tremendous amount of steel that you'd see lifted and taken up in one piece.

Vera Lawson was a twenty year old comptometer operator in the Dorman Long office when she visited the workshops.

I was taken over there when the central hanger was completed and my chief took me over in the launch. He said come on, before that goes up have a look at it and have a touch of it. And so we went over and we saw the central hanger and it seemed to go on forever as we were walking, it was lying of course on the side and it seemed to go on forever but that was indeed quite a privilege. But a privilege to be able to go through the workshops and to be able to see the work that the men were doing, it was such wonderful work and such exacting work. The rivets - there was so many many rivets - and each one had to be perfect in their setting. And they were all very, very skilled.

Incredible as it may seem, the foundations, abutment towers and pylons of the Sydney Harbour Bridge were built by only two gangs, one on the north side and one on the south. Each gang had only one concrete mixer manned by five men. They each mixed sixty thousand cubic yards in five years. Two stonemasons and their labourers set all the stone, two dogmen and crane drivers lifted all the material, six carpenters handled the formwork and only three men positioned the reinforcing. Two labourers poured all the concrete and two men packed it in position.

Jack McCrae was a concrete packer.

They were awkward places and that concerned the main floor as it was called, which was about a hundred and fifty feet up. Somewhere near present deck level and the beams and struts on that were very awkward. I can remember being sent down in one of these beams and I think. what I can remember of it now it was about six feet square and perhaps about ten feet deep and that's also concrete reinforced steel rods and I can remember I had great difficulty getting down between these steel rods where I had to go because the concrete was being more or less poured down on top of me. I was equipped with an oilskin suit and also I remember I had to have a sou'wester on my head, to keep the stuff from, you know, being poured all over me. But that was one of the most awkward jobs I ever had there but still and all I know I got all over the thing correctly because, when it

was stripped there was no - what they call boney stuff - everything had to be a good smooth finish.

Bill O'Brien worked as a carpenter on the pylons.

Here I was, with a job and on my way across the harbour in the ferry looking up at the structure. The timber of course - from down on the ferry - that I could see up there that I would be working on. seemed to be about six by six inches square and about twenty feet, maybe fifteen feet high. When I actually got up there I found that it was fifteen by fifteen inches, and some of it eighteen by eighteen inches and twenty five to thirty feet high. This was quite a surprise, I was wondering how we were going to move it around. It was then I found that all the cutting was done on the road level and these were taken up by crane into their position. It meant you only cut them once because when the crane did the job of lifting them up, they had to be right and it meant that guite a bit of thought had to go into the job that you were doing.

Now, I started up there on this construction of the supports that would hold the concrete of the arch on the pylons, they are called vaults - and they are a semi-circular or barrel type vaults. This created the ceiling of those portions where the traffic now passes through. While I was on that particular section there, I found that I had to do something that was a bit unusual to me.

The timber, to bore a hole through it, and some pieces were eighteen by eighteen sitting on another piece eighteen by eighteen which gave you three feet through; and as you had to bore holes through this for bolts, they had big airdriven drills and these drills had a mighty big hose connected to them. You had to stand up there with your legs apart and hold that drill in a hole that you had made in the timber with a thing called a 'wad
punch' and this just simply chopped a piece of the timber out in round section so that the end of the drill which did not have a leading bit on it would sit in that hole then you had to hold that drill with this three feet long drill protruding out of the machine so that it was perfectly level and straight. If you were on top of it and your legs were apart, you had to hold it so that it was going to go through three feet of timber and come out somewhere near the middle on the other side, hopefully right in the middle. I found this was guite a job to do because you were aware that the drill would stick if you didn't lift it out and clear it and put it back in. Now, if it did stick that meant the drill went around and as you were pretty high up in the air, there was nowhere for you to go but down.

Tom Tomrop was the last of the tin hares, the select gangs of 12 steel erectors who, with the crane drivers, erected the Bridge. Born on a sailing ship in 1891, he had experience of rigging aeroplanes and building skyscrapers in America. For the Federated Ironworkers Association he became the star witness in the dispute for height money.

There was a lot of men working in the sheds, like in the workshop, like you know where the Luna Park is, you know where the shops were. They used to work day and night there too you know, and they used to cart it out on a big punt in the harbour you see, and then we'd pick it up. Sometimes we'd ride up, on a calm day we used to ride up, the people on top, they used to take it off and there'd be one of our boys up there doing the slings, you know. See, one gang tightens the job up you see; it had to be thoroughly tight before you rivet it. Then you've got your cookers there heating the rivets and there'd be another gang of riveters and they are going all the time you know, the noise was terrific there at times; but you see as a rigger you're different, you're here, there and everywhere, you've got to do nearly everything you see, as a rigger.

To build the creeper crane, was one of the hardest jobs I've ever been on in all my life. You had to hang on by your eyelashes you know and you know, tricky, you couldn't stand up there, you had to hang on. A mate of mine asked me, you know, I used to be in the flying business and he was an officer you see, and I met him there, I only had started for a little while you know, and I was working on the creeper crane. I was only there about a week and so he says 'How are you going Tom' I said 'Oh, all right, how are you doing'. 'Oh' he says, 'I wonder if I could get a job there' (he's right down and out). I said 'Oh, you'll have to see the boss' I says 'You see that fellow Ben Tucker', you know Ben Tucker couldn't get him a job but he could ask someone else. Anyway, he got a job and he only stuck to it about three hours and he left, himself. He'd rather go on the dole than be on a creeper crane, you see he wasn't a Rigger or anything like that.

Tom was also in one of the gangs who got their sovereigns for working twelve hour shifts, slacking the cables to join the arch.

Well they had to jack each cable up you know, with this thousand ton jack, you know. Then we just had to turn the nuts just about half a turn or three quarters of a turn you see and then relax the jack again; and then you get the next cable and so on. You had to go day and night. It took us a good while you know, it must be about three weeks I think.

One of the twelve steel erectors, the Canadian Felix Faulkner, died tragically on deck level when the job was almost done.

Oh yes, that was a shame, you know. It was bad luck I suppose, this plate slipping down, and it happened to hit him and I'm only about a few yards away, he was laughing at us doing all the hard work you know, putting the troughings down on the roadway. And his job was just to signal to the crane driver, you know with the hand; he was laughing that he had got a good job because we had to do all the work. And it was just bad luck, you know.

Stan London, assembly boilermaker; was working with his mate, Sydney (Nipper) Addison the day he fell off the arch to his death.

The day he fell off. I had him by the sandshoe, grabbed him, there was just ... there's the chord coming up there; and of course that chord wasn't in one piece by the way, it came up in two sections. And there was a splice plate up the centre of it and we ... this is what we were doing, there's a picture there where I'm leaning over, he's inside and he's sticking the bolt on and I'm just spinning the washer and the nut on and he'd come out and we'd put the pipe on the spanner and he'd get down the bottom and I'd be up the top where the nut was, you know; and after we'd pulled right around he'd pull to the edge of the chord. See, the chord - what would it be, I don't know - eight or ten feet wide, I forget ... yeah it'd be somewhere, ten feet wide it could have been on the bottom chord. This is where he fell off the bottom chord, just where the railway comes out from the arch at that joint just below there, it's there. And he put his hand behind me and you know I said 'Right-o Nip, we'll take another purchase' and he must have put his hand - because Cooke, the Inspector, he was coming up the other side from a scaffolding he was on. And he let a yell out and soon as he did, I thought . . . this spanner hit me in the chest and I rolled because it was on an angle, you know, and I grabbed him by the sandshoe, but well you can imagine a man's weight, ... I couldn't hold him. Silly, isn't it?

Yes, he was younger than me, not much - but still, I should have held him. He had a brother on the bridge too, he was an ambulance officer. And I think that's how he came ... how he got his job, you know, he spoke for him. He'd been at sea this young bloke and when he was sent to work with me, I thought gee, I'm young enough but he's younger still.

George Evernden, a holder-up on the arch, had a very near escape.

On one occasion when the first hanger went up for the roadway, the squad that I was working with, we were put on to that job and there was one rivet, well there was a few rivets, that I couldn't reach off the staging myself. I had to step on a box to reach them and when I put the machine on overhead and turned the air on, it threw me back over the staging and I fell, and as I fell I grabbed the staging and I held on like grim death and my two mates, the man who cooked the rivets and the boilermaker grabbed me. I think they got more of a shock than I did, but it happened on the Friday afternoon which gave me the weekend to overcome it and of course, naturally we knocked off straight away, the boilermaker, myself and the cooker; we were all upset and we went home.

George Evernden remembered the conditions inside the chords on the arch.

It was deafening and practically no lighting at all and as I just told you before, like, I used to stand on the heads of the rivets to try and get a balance to hold the rivet in firm position and sort of ... sometimes we'd have a bit of staging, but mostly we had to find our own footing. We had to wear leather gloves there to stop the sparks and that flying off the rivets and the scale that'd come off the rivets like, after you put them in. There was always like, when you turned the pneumatic rivetter on ... the machine on, the sparks used to fly and I'd often have burns on my neck and arms sort of thing, we had to wear these leather gloves.

Walter Ellis was a holder-up on the arch.

I had a very near escape and this one I must impress on you was half way over on the middle section we were working on the laterals. Which is in the middle of the bridge on the bottom section of the top chord and me being a holder-upper. I caught the rivet this morning to place in the hole for my mate to rivet down but unfortunately I did not change my spike-piece which is at the bottom of the machine that holds up the rivet and is like a piece of two inch water pipe, must be sharp to dig into the steel while the top section which is the plunger, holds the rivet up. Now this point being blunt, when I turned the trigger on for the air to go through for the plunger, it skated - but it took me with it and I went down from the scaffolding roughly about six foot which I hung on like grim death being so young, vigorous. There was two, I think they were riggers, were in the vicinity and they came racing over and they pulled me up by the rubber hose, now I regained my footing on the scaffolding. From then on, of course, naturally I went home for the day.

Hugh Dunn was a riveter on the arch.

Well, I'll say this much, it was as good a job as I've ever been on; they were wonderful the stagings were beautiful suited you lovely and I was very happy to work on the bridge. But there was one thing that struck me very funny, I always think about it too. When I got the job first I got the squad together and the tools and by this time the panel of the arch was out six panels and I got on the launch, they took us out to what they called the working punt. The cage came down, we got the gear in the cage and up we went and as we went up the Sydney ferries were getting smaller and smaller and smaller and I thought, 'Christ I'll never work on this job'. But as soon as I stepped on the chord I lost my fear and I had no more fear from that day on.

Asked if he had ever cut any rivets out, Hugh said:

Hell, I cut plenty of rivets out, I tell you. The Inspector came along and tested your job, right well then you get a chipping machine or a cutting machine and these your tools to cut the other bit out, punch it out, put new rivets in. Along came the Inspector again and he would test it again, had to be right before he let you go to ... he was, oh, they were terrific. And you couldn't have told the rivet was slack. it was just ajar. The whole time I worked on the job doing uphand rivets as you call them, I only had one to come out; on the other side maybe even downhand, you had more rivets to come out than what you'd have uphand.

Peter Meichin worked under foreman rigger, Jimmy Campbell who was killed when he fell from the pylon.

Yes I remember it well, you'd never forget it. We were standing ... we were working the guy ropes and Jimmy was singing out which guy rope to loosen and which one to tighten while we were shifting the pole you see. This is the poles that were carrying the staging for the cleaners, the pylon cleaners. The pylon cleaners had finished on that pylon and we were taking the scaffolding down and the outriggers as well and on shifting the pole, we had to shift the guy ropes as well, you see. Well, this time he's singing out and we were loosing so many guy ropes and a puff of wind came up and shifted that pole just as Jimmy was straddling it to get to the other side and it threw him up in the air and down and alongside the pylon. All the way down he hit that pylon. Jimmy was a big stout fellow you know and then those sleepers I suppose would be about nine inches apart but Jimmy went right through them, right through and into the centre of the pylon down underneath it and when they picked him up every bone in his body was broke. Then the bridge

was stopped, everyone on the bridge stopped. They threw their ropes down the pylon, they wanted volunteers to go down on bosun's chairs - it was the only thing that was left, was the bosun's chairs to go down on you see. So another bloke and I went over on the bosun's chairs, down on a bosun's chair each, scrubbing down the pylon where the blood was. Otherwise it'd have been there forever you see, was all I could think about it.

Frank Villagrand was a carpenter on the formwork on the approaches at North Sydney. It is often forgotten that the bridge approaches built by the Public Works Department provided as much work as the bridge. Much of this was done hurriedly with unemployment relief funds on a rotating three or four day week.

It was a continual pour more or less, they kept it going until the thing was poured, they didn't wait. The columns of the buttresses that held the roadwork, they were built first of course and they had concealed bolts in them which we used for lifting our scaffold up. That's how our formwork was in and then we ... they were in cardboard containers - tubes - and they were pulled out when the pole pullers on and when they went to lift higher they were taken out and to hold the timber of the formwork they were re-put in again to hold the formwork together. And that's how the thing was built up itself, it was more or less ascending its type of scaffold.

Norm Schofield was one of the gang of twelve Public Works plasterers who covered the concrete on the Northern Bridge Approaches with two coats of cement render. He remembered how he finished up.

On getting towards the end I remember quite well the paycart used to come up on a Friday afternoon and he'd go right up to the steelwork. On one particular Friday afternoon, the panicking boss we called him, he came along to me and he said 'The pay cart's up at the ironwork I'll go up and tell him to wait for you' and I said 'Right-o' so he went up there and by that time I'd got the panel finished and everything was OK so I set off to go to the ironwork and when I got half way up he was coming down and he said 'I told them to wait', I said 'Right-o'. So I went up and got me pay, opened me envelope and it was O.K. and I'm walking back on to the iob and he hasn't moved from where I'd first ... and he said to me 'ls your pay right' and I said 'Yes' and he said 'Have you got my ten bob'? and I knew. I knew what he was at and I said. 'There's no ten bob in my envelope for you', he said 'Well you finish tonight'.

Watching it Grow

Bill Brindle was assistant to the Public Works photographer, Bob Bowden, he therefore had an overview of the whole project, including even Dr Bradfield himself.

We had standard negatives of the various designs for the bridges which were put away very carefully and on many occasions we'd get rush demands from Dr. Bradfield to make extra prints of these which he obviously had to present to cabinet or the government of the day, to make his point and we would stay back often late at night to get these through for him. He was a man, a very demanding fellow, he knew what he wanted and he always wanted everything yesterday.

Bill Brindle, like many others, caught the spirit of the Bridge builders.

If you talk about human relationships, my experience of the harbour bridge workers was always that I've never worked with such a more honest, hard-working crowd who were dedicated to their job. Their relationships with each other were, to my mind, excellent and I think that they knew that they were battling against the elements and against all the engineering problems to get this thing across and I think it gave them more or less a common cause.

Opening Day

On 19 March 1932. Sydney Harbour Bridge was officially opened for traffic. It was said that King George V had wanted to open the Bridge, but Premier Lang decided to open it himself. The Governor and the Governor General were included in the ceremonies, but there was considerable anger among the conservative part of the populace at Lang's attitude. The right wing organisation, the New Guard, which was behaving like a private army opposing socialist elements, declared that: 'Premier Lang will not open the Bridge'. Precautions were taken so that any New Guard stunt would not send the signal for the fly-past and other celebrations to begin. Captain FE de Groot, a World War I veteran of Irish extraction and a well known antique dealer, dressed in his army uniform and riding a borrowed horse, attached himself to the rear of the Governor's mounted escort, taking up his position near the ribbon.

The Governor and the Premier had made their official speeches opening the Bridge, when de Groot slashed the ribbon with his sword and shouted 'On behalf of the decent and loyal citizens of New South Wales, I now declare this bridge open.' He was pulled from his horse by the police and hurried away. The incident created a good deal of amusement, the ribbon was rearranged and duly cut by Premier Lang and celebrations by the largest crowd ever seen in Sydney, commenced. De Groot was detained for the weekend at the Darlinghurst Reception House and on Monday morning he was charged with being 'a person deemed to be insane and not under proper care and control'. Having been medically examined during the weekend, he was discharged, and then charged with damaging public property, to whit one ribbon, found guilty and fined five pounds.

Within 5 weeks, Premier Lang was dismissed from office by Governor Game, for issuing illegal orders. Lang had postponed payment of interest on foreign debt, because of the depression. The Commonwealth, under Prime Minister Lyons, had paid the interest and was taking over the State Savings Bank to recoup. Lang ordered that moneys owing to the State of New South Wales be paid in cash direct to the State Treasury, it was for this that he was dismissed.

Tom Evans was a rigger on the Bridge. An ex-sailor, he remembered marching in the Opening Day Procession.

I remember a few girls, oh many girls, singing out while we were walking in the procession 'You'll soon be on the dole mate'. Little know, it was the most meanest thing ever I thought of was that dole. And I tell you, it was hard to find a shilling to put in the gas meter to do a bit of cooking.

The Iron Lung or the Dole

The bridge has a special place in the life of Sydney. It has been called many names. They used to call it 'The Iron Lung' because it kept so many people alive and in work for the 8 years of its construction. The City Railway construction lasted 10 years and employed more people, but there was no pride and affection there. The bridge, however, gives people a sense of awe and pride just to look at it, especially if they worked on it. The people interviewed remembered the time afterwards, when they were on the dole.

Archie Meek was an ironworker in the bridge fabrication workshops until he was put off. He spent the next years toeing the line for jobs twice a day, along the waterside.

We used to go down to Morts Dock and toe the line there, seven o'clock in the morning there'd be anything from five hundred to eight hundred people waiting for might be five or six jobs and then it was home, have a bit of lunch and then out again for the afternoon pick-up somewhere else. Pat Crawley, after he worked on the Bridge as a labourer, was on the dole for nearly two years.

Oh, it was very hard being on the dole. When I first registered for the dole you had to go down to the wharf, I forget the number of the wharf, and you had to register there and you got a dole ticket and you came back, but I only had to do it once. I had to report at Quay Street, Railway Square and they used to give you ... hand you out the food and that, like, in a ... well you had a sugar bag, I had a sugar bag. I wasn't ashamed to carry a sugar bag, I was from the bush and the sugar bag was the bushman's portmanteau, that was his suitcase. Well, I had a sugar bag and I got me tucker in the sugar bag and brought it home to Mum.

We walked everywhere as I tell you, the fellowship was wonderful, the lorries used to go slow if there was three or four of us walking along the road the lorries'd slow up and we'd all hop on the back of the lorry. We never paid any fares and then he'd ease up and we'd all hop off and we'd sit around and they'd come out and say, you know, call the fellows in but the jobs was all spoken to, you had no hope ... people ... you'd go in and ask if there was anything doing and they'd say 'How long have you been out of work, you're keen, you got no hope of getting a job.

So in the finish you got disheartened, that's why I'm so sorry for younger people today, I understand and you get into a groove and you just don't want to do it. If anyone had've told me when I got out of work that two and a half years later I would have been satisfied to go up to Earlwood Oval and sit around all day and watch the unemployed cricket teams and football teams I would have told them that they were lunatics.

Hugh Dunn, boilermaker, had a run-in with the dole inspector when he was put off.

In fact one of the dole inspectors, somebody dobbed me in, doing this cleaning for this fellow and the inspector was waiting for me and I was able to satisfy him, the inspector was quite satisfied that what I was doing was alright. Well you had to do something, didn't you? Them days, what was the rent then - fifteen bob a week. Well you had to find your rent somewhere and that's the way you found it.

Chas Brown, an apprentice boilermaker in the Fabrication Workshops, was fired when he finished his apprenticeship.

I remember going to Sydney Steel looking for a job and they chased me out of the bloody place. There was no hope at all of getting a job. Rather than stop home under the conditions that existed then, I took to the bush. My first stop was Albury, from there with a cousin of mine, we travelled through Victoria and other parts carrying our swag and in fact on the day that the bridge was opened, the 19th of March 1932, I was camped under another much smaller bridge. It was the bridge over the Campaspe River at Ellmore in Victoria. I finished on the bridge without too much fuss, without too much glory, with a great future behind me and the wide open road in front of me.

The bridge builders, the survivors, have told their stories but the sixteen men who died building the Sydney Harbour Bridge will tell no tales. Half of them, eight, were ironworkers, one was a carpenter, one a painter, two were quarrymen and four were labourers.

Name	Age	Profession
Sydney Addison	26	ironworker
James Campbell	44	foreman rigger
Francis Chilvers	52	dogman
Robert Craig	64	braceman
Alfred Edmonds	56	labourer
Felix Faulkner	40	steel erector
Frederick Gillon	33	labourer
Robert Graham	41	labourer
Thomas McKeown	48	rigger
August Peterson	23	slinger

Name	Age	Profession	
Percy Poole	30	quarryman	
Desmond Shirley	27	carpenter	
Edward McNiel	22	ironworker (N Swandells)	
Henry Waters	40	dogman	
Henry Webb	23	painter	
William Woods	42	ironworker	
Since the building of the bridge two more men have died on maintenance:			
Charles Webb	48	ironworker	
Salie Scheffer	62	painter	
Salie Scheffer	62	painter	

Jack Lang's Coathanger

Something about Sydney's Bridge grippedthe human mind and there was (and still is) an outpouring of art of all

The Sydney Harbour Bridge

Great Arch of steel that soars on high, Graceful and yet so full of power

With sweeping curve that glads the eye; 'A golden arch at sunset's hour.'

Here massive granite pylons stand Like sentinels to guard the arch

Which joins forever land to land And speeds progression's onward march.

When night's grey mantle drapes the skies A string of pearls doth softly glow

To light the path where swiftly flies The traffic shuttle to and fro.

'Tis said there is a hoard of gold Where rainbows rest on land and sea

Our 'Rainbow Bridge' will give untold Prosperity in years to be.

Sky-reaching buildings shall arise Where mean surroundings used to be

And one and all shall learn to prize Our glorious City by the sea.

R Chas, G Coulter, March 1932.

kinds, poetry, paintings, prose, songs, cartoons, jokes and theatrical skits.

The Bridge

Twas well to make the crossing in the night; To sense that more-than-vastness, dimly seen; Through faint-revealing whims of errant light; Draping the naked strength with shadow-screen; And just enough of star-beam drifting by; To drench it all in eerie fantasy.

So monstrous still, this leaping dream, ensteeled; Spanned the abysm, and up, beyond regard; In thick shroud-sables of the night concealed; The topmost arches kept their stressful ward; And something from the soul within me ran; To seek the soul of this Leviathan.

Albert Ross, 4 November, 1931.

My Name is De Groot

De Groot's Song

Air: 'When your hair has turned to silver'.

I am de Groot, so shrewd and cute, I opened the bridge that day;

Year after year, the fact's more clear, No matter what Jack may say.

Chorus:

Long before my hair is silver, They will make a bust of me, They will set it up in Auburn, So that all my friends can see; With my fingers to my nose thus, I will stand the livelong day; And when Jack comes past I'll ask him: 'Got a bridge to open today?' University of Sydney Song Book, 1932.

The Bridge In Curve

Artists and photographers were inspired by the Bridge. Of the artists works, probably the most outstanding paintings are Grace Cossington Smith's The Bridge in Curve, and Rolond Wakelin's The Bridge Under Construction. Most of the outstanding photographers of the time are re-presented, Heni Mallard, Harold Cazneau, Rev. Frank Cash, R.P. Moore, Milton Kent the Aerial Photographer, and the Public Works Department Photographers of the day, Robert Bowden and Fred Degotardi.

Appendix I – The Burra Charter (2013)

• The Australia ICOMOS Charter for Places of Cultural Significance

https://australia.icomos.org/wp-content/uploads/The-Burra-Charter-2013-Adopted-31.10.2013.pdf

Appendix J – Minimum standards for maintenance and repair

Heritage Information Series: Minimum Standards Of Maintenance And Repair, NSW Heritage
Office (October 1999)

https://www.heritage.nsw.gov.au/assets/Uploads/a-z-publications/m-o/Minimum-Standards-of-Maintenance-and-Repair.pdf



transport.nsw.gov.au

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